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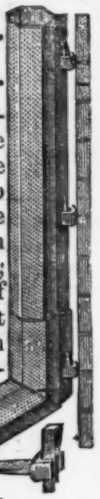

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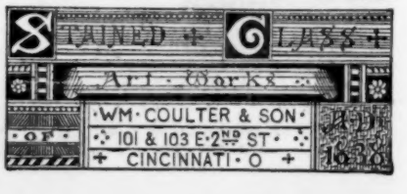

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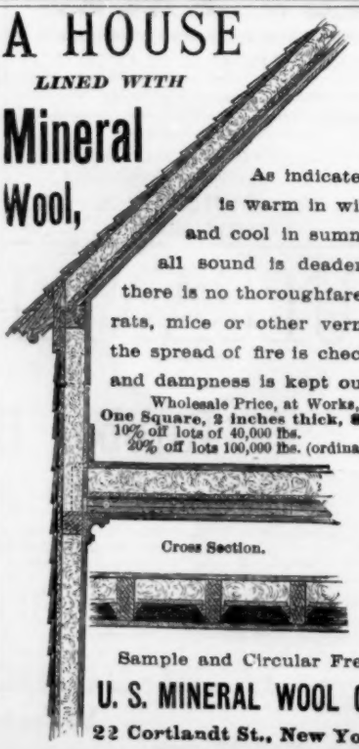

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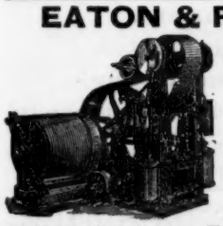
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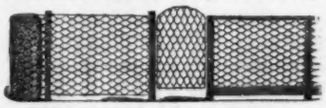
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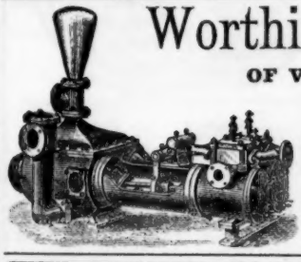
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HANOVER FIRE INSURANCE CO.

Cash Capital	$1,000,000.00
Reserve for Re-insurance	635,741.16
Reserve for all other Liabilities,	96,655.57
Net Surplus	832,744.56
Total Assets, January 1, 1883	2,565,141.29

BUILDING MATERIALS.
Reported for the American Architect and Building News.

BRICK.—₱ M.	New York. (Wholesale Prices.)	Boston. (Prices to Builders and Contractors.)	Chicago. (Prices to Builders and Contractors.)	Philadelphia (Prices to Builders and Contractors.)
Common: *Cargo afloat.*				
Pale	$2 25 @ $3 50	Eastern	Building Brick	Hard
Jersey	4 50 @ 5 00	7 50 @ 8 50	6 50 @ 7 50	8 00 @ 8 50
		Bay State Hard		Salmon
Up River	5 00 @ 5 75	9 00		5 00 @ 6 00
Haverstraw Bay	5 50 @ 6 00	Domestic Com.	Indiana Pressd	Stretchers
" 1st	6 00 @ 6 25	8 00 @ 9 00	16 00 @ 28 00	11 00 @ 14 00
		Domestic Face	St. Louis Fronts	Pressed
Fronts:		@ 18 00	25 00 @ 30 00	20 00 @ 24 00
Croton, Brown	13 @ 14 00	Philadelphia		
" dark	14 @ 15 00	43 00 @ 45 00		
" red	14 @ 15 00	Phila. mould		
Chicago pressed		50 00 @ 80 00	22 00 @ 35 00	
Chicago Moulded			65 00 @ 350 00	
Baltimore	37 @ 41 00		50 00 @	
Glens Falls—white	30 @ 35 00	Glens Falls		
Philadelphia	@ 27 00	25 00 @ 26 00	42 00 @	
Trenton	@ 27 00		40 00 @	
Milwaukee		Glens Falls	25 00 @	
Moulded:		Mould.	60 00 @ 100 00	
Clark's Glens Falls—Red	25 00 @ 27 00	30 00 @ 35 00	30 @	
" —White	30 00 @ 35 00	35 00 @ 40 00	35 @	
White " Mold	45 00 @ 60 00	45 00 @ 60 00	55 00 @ 65 00	
Enamelled: *Imp.*				
Enamelled (edge.)	85 00 @ 100 00	@	@ 100 00	Dom. @ 70
Enamelled (edge and end)	90 00 @ 115 00	@	@ 125 00	@ 85
CEMENT, LIME, etc.—(₱ *cask.*)				
Chicago Lime in bulk			65 @ 75	
Wisconsin "			80 @ 90	
Rosendale Cement	80 @ 90	1 60 @ 1 50	*Not Sold.*	1 35 @ 1 75
Utica, Akron, Buffalo, Louisville, Milwaukee	*Not sold.*	*Not sold.*	1 00 @ 1 25	*Not sold.*
Portland (English)	2 60 @ 3 10	@ 3 50	2 75 @ 3 00	2 30 @ 3 50
" (Saylor's Am.)	2 05 @ 2 40	2 50 @ 3 00	2 75 @ 3 00	2 50 @ 3 00
" (Dyckerhoff)	2 75 @ 3 15	3 00 @ 3 50	3 25 @ 3 75	3 00 @ 3 25
" (Lafarge)	3 50 @ 3 75	*Not sold.*	3 75 @ 4 25	4 50 @
" (Star)	2 70 @ 3 00	*Not sold.*	*Not sold.*	*Not sold.*
K. B. & S. (Eng.) Portland	2 85 @ 3 10		3 35 @ 3 50	3 00 @ 3 25
Burham " "	2 60 @ 2 80		3 15 @ 3 35	2 75 @ 3 00
Vorwohler	2 65 @ 3 25		3 00 @ 3 25	
German (Fewer)	2 50 @ 2 70			
" (Alsen)	2 56 @ 2 80	3 00 @ 3 50	3 15 @ 3 35	2 90 @ 3 25
Selenitic		1 65	*Not sold.*	
Hydraulic Lime of Teil	3 50 @ 4 00		*Not sold.*	
Roman	2 75 @ 3 00	3 50 @ 4 00	2 75 @ 3 25	3 25 @ 3 50
Keene's coarse	5 00 @ 6 00	7 50 @ 9 00	7 50 @ 9 00	6 50 @ 7 00
" fine	9 25 @ 10 25	11 00 @ 12 50	11 00 @ 12 50	11 50 @ 12 00
Lime:				
Rockland and Rockport, (Com.)	@ 95	1 10 @ 1 15	*Not sold.*	1 00 @ 1 25
Rockland and Rockport, finish	@ 1 15		*Not sold.*	
State, com. cargo rates (nom.)	75 @ 80	*Not sold.*	*Not sold.*	*Not sold.*
State, finishing "	@ 1 00	*Not sold.*	*Not sold.*	*Not sold.*
Plaster of Paris (calcined.)	1 30 @ 1 35	1 75 @	@ 1 75	1 60 @ 2 25
" (casting)	1 50 @ 1 65	@ 1 90	@ 2 00	2 25 @ 2 50
Hair (Cattle) ₱ *bush*	25 @ 28	20 @ 25	30 @ 35	25 @ 35
" (Goat)	32 @ 35		35 @ 40	@
Sand, ₱ *load*	1 00 @ 1 25	1 00 @ 1 50	100 @ 1 25	75 @ 1 50
STONE. (₱ *cubic foot, rough.*)				
Granite: (*Maine*)		60 @ 1 00		
Limestone:				
Bedford	@ 1 00		50 @	3 75 @
Joliet	@		35 @ 55	
Lemont	@		35 @ 60	
Serpentine		@ 1 00	80 @ 90	

(Continued on page vi.

10

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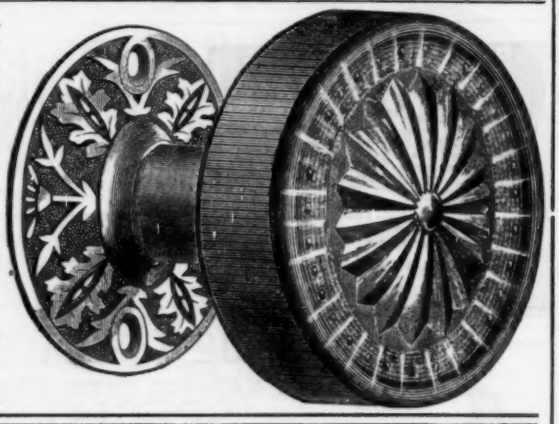

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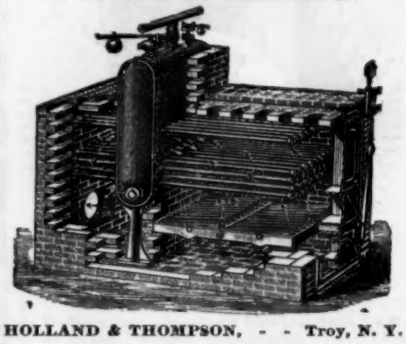

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Foundation:				
Dimension	@	5 00 @ 6 00	20 @ 28	30 @ 5 00
Block	@	@ 5 00	8 50 ₱ cord.	50 @ 6 00
Rubble	@	@ 1 75	8 50 @	
Bluestone: (₱ *sq. ft.*)		₱ perch.		
Sidewalk	30 @ 5 00	30 @	75 @ 1 00	70 @ 90
Planed	50 @ 6 00		50 @ 1 00	1 10 @ 1 25
Sandstone,				
Brown	@ 1	@ 1 40	1 50 ₱ cub. ft.	
Amherst	@	@ 1 05	55 @ 65	
Berea	@	@ 1 05	45 @ 55	70 @ 90
Berlin	@ 1	@ 1 05	55 @ 65	
Bay of Fundy	@ 1	@ 1 00	*Not sold.*	
Belleville	@ 1 40	80 @ 1 00	"	
New Brunswick	@ 1 00	@ 90	"	
Caen	@	@ 80	"	
Marble:				
Lee, Mass.	@	1 75 @ 2 00	*Not sold.*	2 00 @ 2 50
Rutland, white	@	50 @ 1 05	3 50 @ 5 00	2 25 @ 2 50
Sutherland Falls	1 25 @ 1 75	1 25 @ 1 75	3 50 @ 5 00	1 50 @ 2 50
Glens Falls, black	@	75 @ 1 00	*Not sold.*	4 00 @ 4 50
Italian, blue-veined	@	40 @ 50	@ 4 40	—@—
" Sienna	@	75 @ 2 00	*Not sold.*	3 25 @ 6 50
Tennessee, red	@	75 @ 2 00	@ 4 00	2 00 @ 3 00
" Knoxville	@	50 @ 60	@ 4 00	@ 1 50
Pennsylvania, blue	@		*Not sold.*	2 23 @ 2 50
Vermont, white	@	1 50 @ 2 00	3 50 @ 5 00	
Slate:				
Roofing, (₱ *square*)	@			
" green	7 00 @ 8 00	4 50 @ 7 00	6 25 @ 8 10	@ 7 00
" purple	7 00 @ 8 50	4 50 @ 7 00	@ 8 60	@ 7 00
" red	@ 15 00	12 00 @ 13 00	—@ 16 00	5 00 @ 5 75
" black, Lehigh	—@—	*Not sold.*	7 20 @ 7 60	5 00 @ 5 75
" " Chapmans	—@—	*Not sold.*	7 30 @ 8 00	6 00 @ 6 25
Tiles, Am. ₱ M.	@		*Not sold.*	@ 15 00
LUMBER.—₱ M. *(Ordinary dimensions.)*				
Boards:				
Pine, 1st quality, clear	65 00 @ 75 00	53 00 @ 54 00	47 00 @ 49 00	
" 2d quality	55 00 @ 60 00	45 00 @ 48 00	42 00 @ 47 00	
" 3d quality	18 00 @ 22 00	38 00 @ 42 00	41 00 @ 45 00	
Spruce	@ 25 00	14 00 @ 17 00	*Not sold.*	
Hemlock	ea. 17 @ 18	11 00 @ 13 50	@ 10 00	11 50 @ 15 00
Yellow pine	20 @ 40	32 00 @ 36 00	@ 28 00	16 00 @ 18 50
Clapboards:				
Pine	@	35 00 @ 45 00	14 00 @ 22 00	—@—
Spruce	@	26 00 @ 30 00	*Not sold.*	—@—
Framing Timber:				
Pine		30 00 @ 40 00	13 00 @ 15 50	25 00 @ 35 00
Spruce	14 00 @ 18 00	13 00 @ 16 50	*Not sold.*	18 50 @ 20 00
Hemlock	12 00 @ 15 00	8 00 @ 15 00	13 00 @ 19 00	12 00 @ 13 00
Yellow pine	20 00 @ 30 00	25 00 @ 32 00		22 00 @ 24 00
Laths:				
Pine	@	@ 3 00	2 25 @	—@—
Spruce	2 10 @ 2 25	@ 2 50	*Not sold.*	2 40 @ 2 60
Shingles:				
Pine, shaved	5 00 @ 6 00	5 00 @ 7 00	*Not sold.*	
Pine, sawed	4 00 @ 5 50	4 25 @ 5 00	2 25 @ 2 60	
Spruce, sawed	2 50 @ 2 75	1 50 @ 1 75	*Not sold.*	
Redwood	2 10 @	4 00 @ 7 00	5 50 @ 8 00	
Cedar, split	@	2 50 @ 5 50	*Not sold.*	30" $10 @ 28
Cedar, sawed	@	@ 3 75	@ 2 30	24" 8 @ 21
Cypress 7 x 24	18 00 @ 20 00		*Not sold.*	20" 5 50 @ 14
Miscellaneous:				16 00 @ 20 00
Piles ₱ ft.	4½ @ 6	Piles 6c. ₱ ft.	*Not sold.*	
Fence pickets, Spruce	8 00 @ 10 00		Pine, 8 @ 22	12 00 @ 14 00
Cedar posts, 9 ft. (sq. posts.)	@		9 00 @ 21 00	70 @ 1 25
Chestnut	@		*Not sold.*	28 @ 36
Finishing Woods: ₱ M. *First Quality, Kiln-dried.)*				
Ash	@ 55 00	38 00 @ 42 00	35 00 @	
Cherry	80 00 @ 120 00	60 00 @ 70 00	75 00 @ 85 00	55 00 @ 65 00
Chestnut	@ 55 00	38 00 @ 42 00	45 00 @ 50 00	60 00 @ 80 00
Butternut	40 00 @ 60 00	60 00 @ 70 00	45 00 @ 60 00	55 00 @ 65 00
Mahogany, Baywood	@ 180 00	100 00 @ 150 00	@ 180 00	100 00 @
" St. Domingo	@ 350 00	180 00 @ 250 00	250 00 @ 300 00	
Maple	45 00 @ 50 00	40 00 @ 45 00	30 00 @ 35 00	30 00 @ 50 00
Oak, red	@ 70 00	30 00 @ 35 00	35 00 @ 40 00	35 00 @ 45 00
" white	@ 70 00	38 00 @ 42 00	35 00 @ 40 00	55 00 @ 65 00
" quartered	@ 90 00	55 00 @ 60 00	50 00 @	70 00 @ 80 00
Pine, clear	65 00 @ 70 00	45 00 @ 55 00	45 00 @ 50 00	65 00 @ 90 00
Redwood	70 00 @ 75 00	60 00 @ 70 00	60 00 @ 70 00	100 00 @
Rosewood ₱ lb.	@ 6		@ 7	
Walnut, black	125 00 @ 150 00	90 00 @ 120 00	85 00 @ 100 00	160 00 @ 200 00
Whitewood	45 00 @ 50 00	35 00 @ 38 00	32 00 @ 35 00	20 00 @ 30 00
Yellow pine ₱ M.	@ 45 00	32 00 @ 36 00	32 00 @ 35 00	30 00 @ 36 00
Gumwood, best red		60 00 @ 70 00	30 00 @ 35 00	

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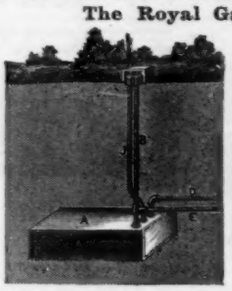

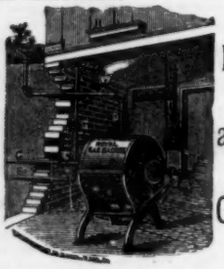

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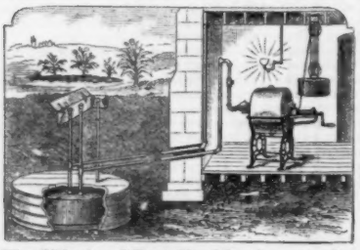

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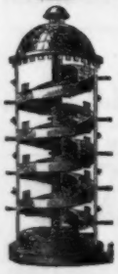

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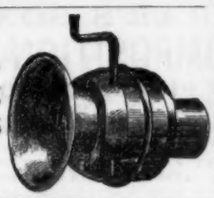

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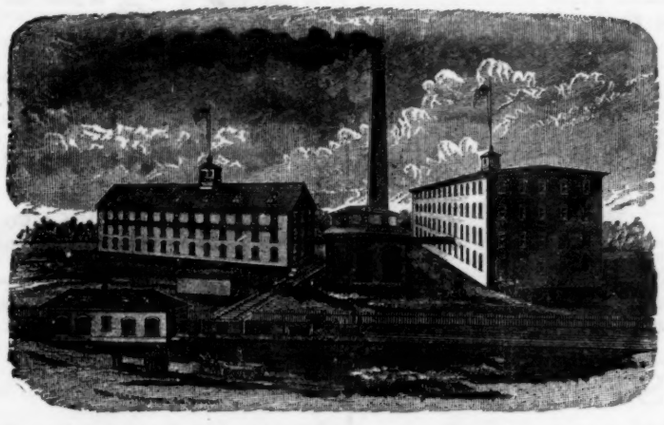

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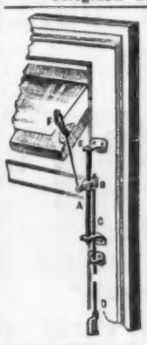

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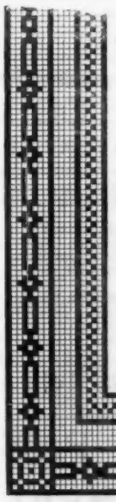

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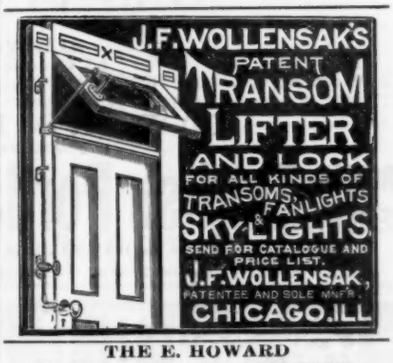

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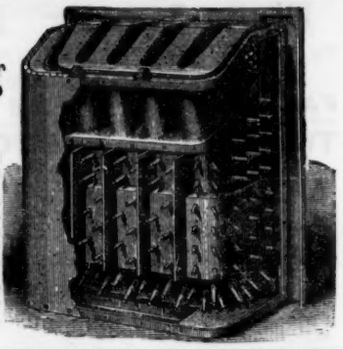

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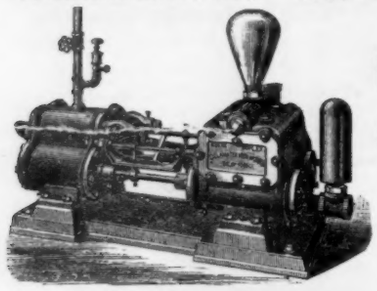

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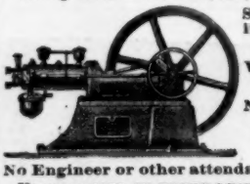

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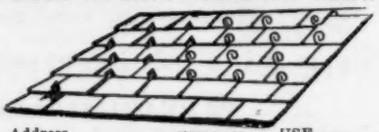

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AUGUST 2, 1884.

Entered at the Post-Office at Boston as second-class matter.

CONTENTS.

SUMMARY: —
Our "Photo-Caustic" Illustrations.— Will Subscribers pay for Gelatine Prints from Nature? — Death of Mr. Samuel Sloan. — The Recent Convention of Master-Plumbers. — Card-Rates and Trade Discounts. — A Compact to "Protect" Working Plumbers — Deep-Sea Sounding. — Animate Life at the Bottom of the Ocean. 49
THE HISTORY OF BRICKMAKING. 51
REPORT ON A UNIFORM TEST FOR CEMENT. 53
THE ILLUSTRATIONS: —
The "Sanitarium," Bath House, Hot Springs, Arkansas. — House at Washington, D. C. — Church, Issoire, (Auvergne), France. — Block of Houses, St. Paul, Minn. — A Bath-House. — House, Boston, Mass. — Some Animals from the Galleries of Notre Dame, Paris. 54
THE REDWOODS OF CALIFORNIA. 55
A WICKER-WORK SCAFFOLD. 56
SOUND-PROOF CONSTRUCTION. 57
THE EFFECTS OF FROST ON BUILDING-STONE. 57
COMMUNICATIONS: —
One Form of Trussed Joist. 58
NOTES AND CLIPPINGS. 58

THE letter of Mr. Wood published in our last issue perhaps deserves some notice at our hands. The insinuation that the *American Architect* is not "alike to all men" we suppose refers to the old accusation that it is published in the interest of members of the American Institute of Architects. As to this, we will only say that we find that up to the close of 1883 we had published designs contributed by four hundred and twenty architectural *firms*, while the membership of the Institute amounted at that time to one hundred and sixty-five *individuals*, — the total membership from the foundation only amounting to three hundred and seventy. Mr. Wood's special grievance, however, is our publication of "photo-caustic" prints from nature. These we freely admit are not satisfactory in every respect, and our attempt to use negatives furnished by amateurs or professional photographers in other cities unfamiliar with the requirements of the process, has reduced the average of excellence in a very undesirable degree. Still with all its deficiencies the process gives the grouping, mass, proportion and general effect of existing buildings in a way that cannot be shown better, except by photographs or gelatine prints, and we believe that as the process is perfected, as all processes are, less and less of the detail will be lost. Our belief has been that the publication of a single photo-caustic page with each issue might be a welcome relief from the monotony of pen-drawings. Still, we are open to correction.

WE are often asked why we do not publish more gelatine prints, such as the view of the North Easton Town-Hall, and not infrequently we hear laments that the "*Sketch Books*" were discontinued. We are ready and able at any time to print our illustrations from gelatine, the presses and men are ready, and there is an infinity of subjects. Why do we not do it, then? Simply because of our unbelief that our subscribers would be willing to pay for such illustrations. The "*Sketch Books*" contained forty-eight gelatine prints each year, and the subscription price was $6.00. The *American Architect* contains at present more than five times as many illustrations, to say nothing of the text, for the same price. Now it is not supposable that our subscribers would pay five times the present subscription for the sake of having gelatine prints, nor yet two-and-one-half times, at which price we might be willing to make the experiment. But as we may be quite in error, we will ask our subscribers in all seriousness how many of them would be willing to pay, say, one dollar more for the sake of having one gelatine print from nature added to our illustrations once each month? This question is worthy of an answer, as it might be possible to print a special edition for those who were willing to pay the extra charge, always supposing that a satisfactory number of subscribers are willing to incur the extra expense.

MR. SAMUEL SLOAN of Philadelphia, one of the best known architects in the country, died in Raleigh, North Carolina, July 19, at an advanced age. Although belonging, like other architects who began business fifty years ago, to a school which has ceased to excite commotion, in the artistic world, Mr. Sloan was one of the most distinguished of that school, and his career, in activity and usefulness, was one which the ablest of the younger generation might be glad to emulate. Indeed, many of the younger architects throughout the country owe something of their knowledge to the excellent books in which he sought to convey to others the results of his experience, and he deserves the credit of having been one of the first persons in the country to perceive the deficiency in technical literature which he afterwards endeavored to supply by the publication of his *Architectural Review and Builder's Journal*. Among the professional works which he executed were the old Masonic Temple and the Tradesmen's National Bank, in Philadelphia, the State Exposition Building and the Governor's Mansion in North Carolina, many private houses, and, particularly, a great number of hospitals and asylums in various parts of the country.

THE *Hydraulic and Sanitary Engineer* contains an excellent report of the Convention of the National Association of Master-Plumbers, held recently in Chicago, in which we find several things of considerable interest to architects. In the first place, we take satisfaction in saying that the business of the Convention seems to have been conducted with remarkable skill and good sense, and all those who attended it, or who read the reports of it, must feel that the interests of the trade which the Association represents were perceptibly advanced by the meeting. In the selection of the principal officer of the Association for the next year the Convention appears also to have been remarkably fortunate, Mr. Andrew Young, of Chicago, the new President, having already distinguished himself by his patriotic and sensible suggestion that the members of the great trade at the head of which he stands should be called upon in case of need to serve as auxiliary sanitary officers for the benefit of the community to which they belong. No one knows better than an architect how well qualified good plumbers are for rendering such service; and if a pestilence should drive the people of our great cities, under fear of death, to undertake at last the long neglected task of purifying their material existence, we could hardly urge too strongly the adoption of President Young's idea, and the placing of the details of domestic sanitation mainly in the hands of a commission of such plumbers as those who are fortunately already numerous in this country.

HAVING done this justice to the evident desire of the master-plumbers to advance their art as well as their own interests, we feel ourselves obliged to criticise some of the means by which, as we understand them, they hope to forward the latter. We have before spoken of the opportunities for fraud which were afforded by the enormous differences between the printed list-price of some kinds of plumber's goods and the actual cost, which was generally concealed, by collusion between the manufacturers of such goods and the plumbers, from those who paid for them. Unlike mercantile business, a great deal of the best plumbing-work is carried on under a confidential and honorable relation between the plumber and the man who employs him, and who willingly pays him, as compensation for his skill and time, a percentage on the cost of the material and labor. This percentage is generally intended to be a liberal one, and the obvious duty of the plumber who works under such an agreement is to take from his employer a fair profit on the materials and nothing more. Many plumbers, as we know, scorn to take advantage of the opportunity which the dealers, by concealing the real cost of their goods, intend to afford them for obtaining, unknown to him, an exorbitant profit from their confiding employer; but others, by presenting the list-prices as the basis of their bills, succeed, until they are found out, in paying themselves much more liberally than they deserve. Sooner or later, however, they get found out. The persons whom they have fleeced meet with others more experienced in the ways of the world, or perhaps have their own eyes opened by the offer, which we have known made, of a rival plumber to do certain work for less than the price-list cost of the materials alone, and a revelation of this kind, whatever the Master-Plumbers' Association may think of it, excites in the mind of the individual who experiences it a lively feeling of having

been robbed, and is apt to leave, moreover, a decidedly unfavorable impression regarding the honesty of plumbers as a class.

IN the Convention of the National Association of Master-Plumbers, held last year, a good deal of indignation was expressed against certain dealers in plumbers' materials who sold their goods to other persons at the same rate as to plumbers, and the opinion of the Convention seemed to be that such dealers should be compelled to "protect" plumbers by selling to them at a lower rate than to any one else, under penalty of losing the custom of the whole plumbing trade. One house, in particular, which, as we recollect, made a virtue of selling certain classes of its goods to private individuals in preference to plumbers, on the ground that by dealing directly with owners the latter were sure of not having an inferior article substituted for what they or their architect desired, while the firm was more certain of getting its pay from the owners than from the plumbers, seems to have been the object of special animosity in the trade, and the Executive Committee of the Association was deputed to coerce all the refractory dealers. We regret to say that the Committee seems to have been completely successful, and at the convention held in June, it reported that an agreement had been made by which certain of the largest manufacturers and dealers in plumbing material bound themselves "not to sell to others than plumbers regularly engaged in the business, public institutions, corporations, and parties employing their own plumbers, except at a reasonable advance on the wholesale price to plumbers." The paper was signed by the representatives of the J. L. Mott Iron Works, Mr. Fred Adee, Messrs. Abendroth Brothers, Mr. Henry Steeger, Messrs. Mayer & Lane, Mr. Henry Huber, and the Meyer-Sniffen Company, and those interested will take notice that the goods manufactured by these gentlemen can be had by private parties only at a "reasonable advance" on the price which the plumbers pay for them, and as a consequence of this they will probably discover, as we have, that the plumbers' idea of a "reasonable advance" being more elastic than that of the dealers, they can buy these goods to much better advantage by competition among local plumbers than by ordering them directly from the producers. In some places, as it seems from the discussion in the convention, the plumbers sell gas-fixtures in addition to their other wares, and as the difference between the "long price" and real price of these is enormous, and house-owners naturally like to save one-third, or so, of the cost of their fixtures by getting them of some one else than the plumbers, the latter are demanding "protection" in this as well as in their more appropriate business. One of them, indeed, won the applause of the convention by saying that in his own city none of the plumbers connected with the local association would put up gas-fixtures bought of anybody except a plumber. It is not very surprising to find, on reading farther, that this gentleman's gas-fixture business has fallen off "fifty to seventy-five per cent" since he and his brethren took this resolution, and we venture to predict that, while no reasonable man will object to allowing plumbers a fair profit on goods which they furnish, to pay for handling them, the attempts which we have known made, to charge unsuspecting employers three times the cost of goods which were simply ordered sent from the manufactory to the job, cannot long be made successful by any combinations, agreements or threats; and those plumbers who do not wish to see "fifty or seventy-five per cent" of their business leave them will do well to treat their customers as they wish to have their customers treat them, seeking the protection of their interests in a well-earned reputation for fair and honorable dealing, rather than in occasional opportunities for betraying the confidence of men who do not know the real value of the goods they buy of them.

Le Génie Civil gives an interesting account of the recent expedition of the steamer *Talisman* for the determination of the depth of certain parts of the sea, and the investigation of the objects, living or inanimate, which are to be found there. Until within a few years, very little has been known about any of these matters. Arguing from the laws of hydrostatic pressure, some persons maintained that the water of the ocean in its greatest depths must be solid, while others, better informed, were disposed to admit that although the character of the water could not be changed, its weight, acting in all directions upon bodies submerged in it, would preclude the existence of living beings more than a few hundred feet from the surface. As the hydrostatic pressure of a column of water a mile high would be more than a ton to the square inch, and at the bottom of the deepest part of the ocean would be five or six times that, the theory that no creature with organs and muscles could live, compressed by such a strain, seemed reasonable, and it was not until extensive soundings were made along the "telegraphic plateau," before the laying of the first electric cable between Ireland and Newfoundland, that evidence was found of the presence in the deep sea of tiny mollusks, whose shells covered the submarine plateau with a soft and thick bed. Even this indication was not, however, regarded as conclusive, some maintaining that the little shell-fish had lived and died in the surface-water, their shells only sinking to the bottom after their owners had ceased to inhabit them.

AN additional reason for doubting the possibility of animal existence below a certain depth was afterwards found in the discovery that light penetrates only to a short distance, even in the clearest water. In the Lake of Geneva, perhaps the purest large body of water in the world, fresh chloride of silver is no longer affected by light at a distance of about one hundred and sixty-five feet below the surface, and recent experiments have shown that an Edison electric lamp, plunged to a depth of eighty feet into the sea, is invisible from the surface. The expeditions of the last ten or twelve years have, however, proved beyond a doubt that even the conditions of total darkness and immense pressure do not interfere with the development of animal life in varied forms in the greatest depths which have yet been explored. Not only the lower organisms, such as crustaceans and mollusks, but fishes so highly developed as sharks, are found miles below the surface, and in some places the number of creatures, as shown by the quantity of them brought up together in the dredge, is almost incredible. Much interest is added to the investigation by the fact that the deep-water animals differ in almost every respect from those found nearer the surface. Many of them are found to present forms known hitherto only in certain fossil species, while others are entirely new; and it has been discovered that some of the creatures common in the surface waters of the North Atlantic reappear again, but only at a considerable depth, in the warm equatorial seas, the distance from the surface at which they live increasing as the distance from the equator diminishes. As if to compensate for the darkness of the deep sea, a very large proportion of the animals which inhabit it are phosphorescent. Certain sharks are found to have their skins covered with a mucus so luminous that one can see to read by the light which shines from them, and the phosphorescence of many animals is not only very bright, but colored, some large crustaceans, like lobsters, shining with a red light, while the star-fishes show a rose-color, and the great sea-worms a brilliant purple. One kind of fish, we are told, has the brightness of his presence enhanced by phosphorescent lanterns, furnished with convex lenses in front, which he carries under his eyes. It is not very plain why a fish should need this kind of locomotive head-light, since the total illumination which he would diffuse would be quite as great without the convex lenses as with them; but those who try earnestly to believe the story will probably be rewarded in time by finding out the purpose of the apparatus. Aside from the discoveries made, the apparatus used for making them is interesting. It is hardly necessary to say that the old-fashioned hemp line is useless for deep soundings, and the modern investigations are made with the help of a very fine steel wire, weighing less than thirty pounds to the mile. The wire is kept coiled in a strongly alkaline liquid, to prevent corrosion, and when used is attached, by means of a short length of hemp cord, to a sinker weighing from fifty to one hundred pounds, according to the presumed depth of the water. The sinker is so arranged that the weights with which it is loaded are detached when it strikes the bottom, and as they fall off they serve to shut the valve of a small cylinder which forms part of the sinker, enclosing in this way a little of the sand or silt of the bottom, which is drawn back with the wire to the deck of the ship. The dredge, with which specimens are raised from the bottom, consists of a net, or, rather, of two nets of different sizes of mesh, drawn up by a small steel-wire cable. The mouth of the dredge, which has the capacity of a large hogshead, is held open by a light iron framework, and bunches of rags and thread are hung about the interior, which serve to collect animals too small to be retained in the nets.

THE HISTORY OF BRICKMAKING.

BRICKS have been employed from the earliest times in the execution of many undertakings of grandeur and magnitude. A complete history of brickmaking would be analogous to that of civilization with its advances and declines, for the authentic record of this branch of pottery is older than that of any other ceramic production, extending through forty-one centuries; the descendants of the sons of Noah, who journeyed from the East and located on the plains of Shinar, being the first potters of whom we have positive attestation.

In our own times structures of great altitudes have been projected; but the Washington Monument and similar undertakings appear insignificant when compared to the stupendous conceptions of those bold men, who, in 2247 B. C., said: "Go to, let us make bricks, and burn them thoroughly." And they said: "Go to, let us build us a city and a tower, whose top may reach unto heaven."[1]

The story of the manner in which this proposed monopoly of that portion of space between earth and heaven was defeated by confusion of the tongues of the builders is too familiar for repetition here. But that something was accomplished will appear from the speech of Moses to the Israelites, delivered seven hundred and ninety-six years later, in which cities in the land of Canaan are referred to as being great and walled up to heaven.[2]

In tracing development in the art of brickmaking we find that progress has often been slow and uncertain; it has flourished in ages of prosperity with other arts, and like them it has been lost in ages of darkness; but as with them it awoke with the Renaissance, and is steadily improving with the progress of time and the spread of knowledge.

Machinery is doing much to lighten labor, but in all ages the work required to make bricks has been of the hardest kind, and many have been faint with toil in their production, in modern as well as in ancient times.

The children of Israel, as early as 1706 B. C., were made to serve the Egyptians with rigor, and their lives were made bitter with hard bondage in mortar and in brick; and Pharaoh, in 1491 B. C., in order to increase the burdens and labor of the Israelites, commanded the task-masters, saying, "Ye shall no more give the people straw to make brick, as heretofore; let them go and gather straw for themselves, and the tale of the bricks, which they did make heretofore, ye shall lay upon them."[3]

Pictures illustrating the above passages are still preserved on tombs in Thebes, in which some of the laborers are represented carrying water in large pots to temper the clay; others carry on their shoulders large masses of clay to the moulder, while others, still, are bearing off the bricks, and laying them out on the ground to dry, the dried bricks being carried in yokes suspended from the shoulders of bowed and weary laborers. Task-masters, who were personally responsible for the labor of their gangs, are plentifully represented, observing that there was no shirking of the labor or slighting of the work.

The mud of the Nile is the only material in Egypt suitable for brickmaking; the modern plan is the same as the old; a bed is made into which are thrown large quantities of cut straw, mud and water, and this is tramped into pug, removed in lumps, and shaped in moulds, or by the hands. The moulded clay is sun-dried, not burned, the bricks of Egypt, both ancient and modern, being adobes.

Herodotus testifies that the walls of Babylon were built of bricks made from the clay thrown from the trenches surrounding the place. Accounts of the extraordinary mounds of bricks at Birs Nimrod, the supposed site of Babylon, and the remains of other ancient cities of the stoneless plains of the Euphrates and Tigris have been given by noted Eastern travellers. The buried palaces of Nebuchadnezzar have for a long series of years provided bricks for all the buildings in the neighborhood; there is scarcely a house in Hillar, a city of over 8,000 inhabitants, built close to the ruins of ancient Babylon, which is not almost entirely built with them. "To this day," says Layard, "there are men who have no other trade than that of gathering bricks from this vast heap, and taking them for sale to neighboring towns and villages, and even to Bagdad." Many bricks found in this ruin are coated with a thick enamel or glaze. The colors have resisted the effects of time, and present their original brightness.

On every brick that was made during the reign of Nebuchadnezzar it was his custom to have his name stamped, and Sir Henry Rawlinson, the Oriental scholar, in examining the bricks in the walls of the modern city of Bagdad, on the borders of the Tigris, discovered on each brick the clear traces of that royal signature.

The Babylonish bricks were usually of three colors: red, pale yellow, and blue, and also in all ancient Egyptian decoration the primary colors, red, yellow, and blue, were principally employed; green was the only secondary, to which were added black and white. The profuse employment of colored decoration is the distinctive feature of Babylonish architecture, the bricks being stamped out of a mould, and impressed with cuneiform inscriptions, which is a certain form of writing, the component parts of which may be said to resemble either a wedge, the barb of an arrow or a nail, the inscription being placed in a sunken rectangular panel. The sizes of the Babylonish bricks vary, the burned ones being thirteen inches square and three inches thick; the adobes or sun-dried bricks measuring from six to sixteen inches square, and from two to seven inches thick. The adobes were laid in clay, the work being striped horizontally every four or five feet in height, with thick layers of reed matting steeped in bitumen to form the bond; the burned bricks were laid while warm in hot bitumen, the bond being formed in the laying. In addition to the above kinds there were triangular bricks for corners of walls, and wedge-shaped bricks for arches, which were sometimes concave below and convex on top.

It is thought that the business of brickmaking was a royal monopoly in Egypt, as a very large number of bricks are found in that country with the stamp of Thothmes III, who is believed to be the prince who reigned at the time of the Exodus of the Hebrews. The bricks of this prince are impressed with his cartouche, which is an oval, on which the hieroglyphic characters used for his name were stamped, and the adobes made by him were 12 inches long, 9 inches wide and 6¾ inches thick, and one in the British Museum weighed 37 pounds and 10 ounces.

Recent excavations have been made on the site of the Pithom, the treasure city built by King Rameses II with the bondage labor of the children of Israel. The buildings prove to have consisted almost entirely of tremendous storehouses built of adobes: some of these sun-dried bricks were made with straw and some without it. And explorations have been commenced on the site of the ancient city of Tanis, the capital of the Hyksos, or Shepherd Kings, one of whom, it is supposed, was the Pharaoh who ruled Egypt when Joseph was carried there. Some of the mysteries surrounding that period it is hoped will be solved, and very interesting developments are looked for when these researches are begun.

The great perfection to which the ancients carried the art of brickmaking is probably due to the abundance of labor, plenty of time to devote to each stage of the work, their great patience and painstaking, and the natural drying and preserving climate of the East. The dry, warm atmosphere of Egypt, Assyria and Babylonia, which countries were the nurseries of the ceramic arts, has kept in a good state of preservation for more than three thousand years the sun-dried bricks so common in those countries; many well-preserved adobes are also found in town and walls of ancient India.

Bricks, burned and unburned, were employed in the construction of the Great Wall of China, which is the most remarkable fortification ever erected by human hands; millions of men were employed for the space of ten years in its construction, and it was completed in 211 B. C. The length was about 1250 miles, the height averaging about 22 feet; each face of the wall was built of hewn stone or brick, and filled in between with earth; it was wider at the bottom than at the top, which was sufficiently wide for six horsemen to ride abreast; it was built by the great emperor of China, Shee-Hoang-Ti, who is the national hero.

It is probable that burned clay did not find great favor with the ancient Greeks, as they possessed an abundance of stone.

The walls of Athens, on the side toward Mount Hymettus, were built of bricks, and this is probably the largest undertaking in which they were employed by the Greeks.

The use of bricks for architectural construction was never, at any period, extensive in Greece, but in some few cases they were employed in minor public edifices. Their first application has been attributed to Hyperbius, of Crete, and Euryalus or Ayrolas. The bricks were made with a mould, and were named after the number of palm's lengths.

In the first century of the Christian era while the bricks made by the Romans were of a superior quality those made by the Greeks were very inferior.

But little is known of the material used in the early buildings of the Latin cities; yet judging from the great extent and destructiveness of the fires in Rome, it is inferred that wood entered largely into the construction of buildings to the time of Nero. During his reign in A. D. 64, two-thirds of the city was destroyed by fire. Augustus, who devoted so much time and thought to the beautification of Rome, had restricted the height of buildings to seventy feet, but this height was still further curtailed by Nero after the great conflagration, and in the rebuilding a certain part of the houses were constructed of a fire-proof stone from Gabii and Alba.

With the conquest of Carthage, Greece and Egypt, the Romans became acquainted with the arts of those subjugated countries, and tried to improve upon and use them for the embellishment of the imperial city, and it was most likely their innate desire for improvement that led to the burning of bricks in kilns.

Although burned bricks were used in the tower of Babel, and to

[1] *Genesis* xi: 3, 4.
[2] *Deut.* 1: 28.
[3] *Exodus* v: 7, 8.

face the adobes used in the building of the walls and palaces of Babylon, it is probable that the credit of first burning bricks in kilns belongs to the Romans, but it is hard to fix the time when this improvement took place.

Layers of thin brick, separating the tufa surface into panels, called *opus reticulatum*, were used in the time of Augustus. In the time of Nero the walls were faced entirely with excellent brickwork called *opus lateritium*.

Pliny says that the bricks made in Greece at this time were very inferior, and not fit to be used in the construction of a Roman dwelling, and that no party-wall was allowed to be more than eighteen inches in thickness, and that the material would not support one story.

The bricks must have been of a very poor quality, or else Pliny greatly misjudged their strength, for at the present time many buildings are being constructed, four and five stories in height, with the party-walls for most of the way only nine inches in thickness, of the poorest kind of "salmon" brick, from which the water has barely been driven out by the action of the heat; and if Pliny could see some of the bricks now used he would quake for the safety of the occupants of some modern hotels, apartment-houses, office-buildings and dwellings that have recently been erected for speculative purposes in London and some portions of this country.

In the first century of the Christian era the bricks were better than at other periods; they were large, flat, and thin, generally two feet square and one inch thick, and were what we call Roman tiles, but were used for building walls, and not merely for roofing or pavements; the facing bricks were triangular, the broad side being outwards. But bricks gradually became thicker and shorter, until in the fourth century they were very often as many as four to a foot on the face of the wall, which is about the same as in modern structures.

The Romans did not build their walls entirely of bricks; they were used only as a facing or veneering, the same as we use front or pressed bricks, the remainder or backing of a wall being of concrete, and thus we find that a large number of the great Roman buildings are constructed of concrete, faced with brick.

The brickwork of the first two centuries of the Christian era, the crowning period of art in Rome, was superior to any other. In the third century there was barely a perceptible change, but in the fourth there was a most decided deterioration, and brickwork went back with the times, old material being re-used extensively, as in the arch of Constantine.

Knowledge of the art of brickmaking has probably at no time become entirely extinct in the East, but after the fourth century, in sympathy with the decline of all other arts, and the dying Roman civilization, the knowledge of this art gradually expired, and was lost in Western Europe.

The Romans made bricks extensively in Germany and England, and though it might seem strange that such an art, when once acquired, should have been lost, nevertheless the remains of buildings between the Roman times and the thirteenth century show no evidence of bricks having been made in England. In a few instances only were they re-used as old material from buildings left by the Romans, as at Colchester and St. Alban's Abbey, the old Roman town of Verulamium, near which the latter is situated, supplying material for it.

The buildings of the Anglo-Saxons were usually of wood, rarely of stone, until the eleventh century, and it is not improbable that the primitive English churches may be among the earliest stone buildings of Western Europe, after the time of the Romans. In these buildings the arches are generally plain, but sometimes they are worked with rude but massive mouldings. Some arches are constructed of bricks, all of them taken from some Roman building, as at Brixworth, or sometimes stones are employed, and these usually have a course of bricks or thin stones laid upon the top of the arch, as at Britford Church, Wiltshire.

It has been thought that bricks were made in England, under the direction of Alfred the Great, as early as A. D. 886, and it is possible that, in rebuilding London and other cities which had been destroyed by the Danes, bricks were used; but this is not probable, as there are but few buildings in any part of Western Europe now in existence that are earlier than the eleventh century, and if bricks were made in the time of Alfred, in England, there are none at present in existence, and no authentic history of any building erected in his reign, in which they are said to have been used, and it is most probable that the earliest true modern or Flemish brick building existing in England is Little Wenham Hall, in Suffolk, which was erected in A. D. 1260.

In the reign of Henry VI, brick construction was not general, Hurtsmonceaux Castle, Sussex, built early in his reign, being one of the principal brick buildings of that period; but under Henry VIII and Elizabeth, the manufacture of bricks flourished, and they were used mostly for large buildings, the smaller ones being of timber construction, in which small panels of ornamental brickwork were sometimes formed and exposed between the upright studs.

Only a few instances of early fourteenth-century brickwork occur, and they are towards the close of the style; but in the fifteenth century brickwork became common, and we have in the Lollards' Tower, of Lambeth Palace, built in A. D. 1454, and the Manor House, or older portion of Hampton Court Palace, Middlesex, built in A. D. 1514, good examples of the English brick architecture in mediæval times. The ecclesiastical and palatial architecture of Italy of this period i rich in many beautiful specimens of brickwork, and in addition to the employment of colored decorative brickwork, the most elaborate mouldings and ornamentation in terra-cotta and brick are exhibited.

Until the first quarter of the seventeenth century, the bricks made in England were of many different sizes, but by Charles I, in A. D. 1625, their size was regulated and made nearly uniform.

After the great fire of London, in September, A. D. 1666, brick was the material universally used in the reconstruction, and ornaments carved with the chisel were introduced into some of the brickwork erected towards the last of that century in that city.

In A. D. 1784, bricks were subjected to taxation by George III, which burden was not repealed until A. D. 1850; the tax for this time, two-thirds of a century, averaging about 4*s.* 7*d.* per thousand for common bricks, and about 10*s.* per thousand for the finer grades.

The material of which a town is built depends generally upon the geology of the surrounding district; as in a mountainous country, like Scotland, cities of stone, such as Edinburgh, Glasgow, and Aberdeen naturally abound; but London and most of the great cities of England, being situated in alluvial valleys and plains, are built of bricks made from the alluvial clay beneath and around them. In Holland and the other provinces of the Netherlands, where no stone except a very soft and inferior sandstone is found, the use of brick as the chief building material became almost universal from earliest times, even the paving of the streets and other public works being done with bricks. There are buildings in some cities of the Netherlands in which stone has been largely used, but they are the exception rather than the rule.

Peter Mortier, in a small book published in A. D. 1782, gives a description of the city-hall of Amsterdam. He says that the old city-hall was erected earlier than A. D. 1400, that the front and sides rested on divers stone columns, and that on one side there was a four-square stone steeple, that the building was burned July 7, A. D. 1682, and the heat was so great that everything was consumed except a piece of brickwork in the steeple. The new building was constructed on the site of the old one, but was commenced in 1648, part of the old structure having been taken down to make room for the new. In order to obtain a foundation for the new building, 13,659 piles were driven, upon which were placed seven feet of brickwork to form the foundation.

It was under Wouter Van Twiller, of Amsterdam, a governor appointed by the Dutch West India Company, that the first brick buildings were erected in this country. In 1633, soon after his arrival on Manhattan Island, Governor Van Twiller erected for his own use a substantial brick house, which was the most elaborate private dwelling which had up to that time been attempted in America, and during the remainder of the Dutch dynasty this dwelling served for the residence of the successive chiefs of the colony. He also built several small brick dwellings for the officers, which with his own were erected within the walls of the fort. The bricks used in these buildings were brought from Amsterdam, and were of such a good quality that but few were broken in the long and rough voyage. The Dutch seem to have succeeded well in making a strong and very durable quality of brick, which bricks have been famous from an early period for soundness, and specimens of them brought over by the early settlers from Holland are yet to be met with in some of the old Dutch houses of New York.

Among the Puritan emigrants to New England money was very scarce, and, under Winthrop, carpenters and bricklayers, whose services were in great demand and had a monopoly price, were forbidden to accept over 12*d.*, and afterwards, in 1630, 2*s.* per day, the penalty being 10*s.* to giver and taker. The bricklayers were also the stone-masons; they ranked under the first head, but a much larger amount of building was done in wood and in stone than in brick in those times.

The earliest settlement in this country in which brick-makers are recorded as being part of the population was the colony of New Haven. In this industrious and inventive little company it is probable that the first bricks made in this country were burned in 1650. They had no rich backers willing to foot the bills for costly brick buildings, as the Dutch West India Company had done for Governor Van Twiller in his building operations at Manhattan, or New Amsterdam, as it was called at a later period. They had made several attempts to produce bricks at earlier times, but had failed, and it is not probable that the very few which they did succeed in burning were of a very superior quality. But like the building of their ship, which sailed from their ice-bound shore and was never again heard of, though faulty in many respects, their production was an evidence of great energy, and it is the inheritance of this same quality that has made all that section of country a great manufacturing and inventive district.

The Virginia colonists possessed clay of a far superior quality for brick-making; but they do not seem to have made any attempt to utilize it. A few bricks were brought from England and used in the furnaces of an iron-foundry and a glass-house, both of which were destroyed during the great massacre of March, 1622, and appear to have comprised the entire manufactures of the colony.

Brick has been a choice material for building purposes in the State of Pennsylvania from its primitive days. In a letter from William Penn to his agent, J. Harrison, at Pennsbury, written in 1685, in speaking of a lady who had purchased land and intended to emigrate, he said: "She wants a house of brick, like Hannah Psalter's, in Burlington, and she will give £40 sterling in money and as much more in

goods. It must have four rooms below, about 18 x 36 feet large, the rooms 9 feet high, and two stories height." Some idea of the great purchasing power of money in those days, as well as the price and value of buildings, can be seen from the above.

In 1705 the price of bricklayer's labor in Philadelphia was 3*s.* 6*d.* per day, and the price of bricks 22*s.* per thousand. One of the oldest public buildings in this country constructed of brick was the old court-house in the city of Philadelphia, commenced in the fall of 1705, and to these Pilgrim fathers the erection of this building was a great undertaking and their largest endeavor. Gifts, fines, assessments and forfeitures were all combined to give it the amptitude of a "Great Towne House" or "Guild Hall," as it was sometimes called when first built. To modern ideas this building was small and ignoble; but in those days it was grand and imposing in the eyes of all the populace. The total expense of the structure was £616, the bricks costing 29*s.* 6*d.* per thousand, and the brick laying costing 14*s.* per thousand. This primitive building was erected in the middle of High, or as it is now called, Market Street, at the corner of Second, and after being used for various purposes for one hundred and thirty years, it was demolished in the spring of 1837. For about twenty-eight years it was used as a court-house; but its use for that purpose was superseded by the erection of "the new State-House," or "Independence Hall" as it is now called, which was built of brick in 1733. Another primitive brick building in that city was the "Great Meeting-house" of Friends, at the south of the "Great Towne House," on the corner of Second and High Streets. This building and the surrounding brick walls which inclosed it were erected in 1695, the ground being given for that purpose by George Fox, for "truth's and Friends' sake." Early in 1719 bricks came into use for foot pavements in Philadelphia, and the great demand for them made the material very expensive.

Bricks do not appear to have been much used in the early buildings of Boston, as wood seems to have been the favorite material for building purposes with the Puritan emigrants, stone being sometimes employed. The first "Towne House" erected in Boston was constructed of wood; it was built about 1657, and stood at the head of State Street, and was consumed in the great fire of 1711. Its successor was a brick edifice, erected in 1712, on the same spot, which in turn was destroyed in the fire of 1747. The "old State-House" was built the next year, 1748, and as late as 1791 it was described as "an elegant brick building, 110 feet in length and 38 in breadth." The first Episcopal church in Boston was erected in 1689, of wood, at a cost of £284, and was at the corner of Tremont and School Streets. The "Triangular Warehouse," which stood at the head of the "towne dock," was one of the earliest brick buildings erected in Boston; it was built by London merchants about 1700. Its foundation was of stone and its walls of brick, which were of a larger size than the bricks of the country in later times.

Brickwork became common in this country in the early part of the eighteenth century, and until the trouble between the colonies and the mother country, bricks were imported mostly from England. There was not much inducement to produce home-made bricks previous to this time, as vessels sailing with light cargoes for the colonies would finish out with bricks, which commanded ready sales at moderate prices, rather than with stone ballast, which would have to be thrown overboard before receiving their heavy return cargoes of tobacco and other exports of the colonies.

In this way a number of brick buildings were constructed on the tide waters of the Atlantic coast, in the times which preceded the troublesome period of the Revolution. At the period immediately following this war, there was but little done in the line of building; the generally distressed condition of the industries and the finances of the country was a bar to any improvements except such as were in the nature of repairs necessary to make buildings inhabitable.

The condition of things after the adoption of the Constitution gradually changed; churches and other buildings of a public character, which had remained in an unfinished state during the entire period of the war, were completed, and a few houses of a substantial character were erected in some portions of the country, home-made bricks being generally employed when they could be obtained, and the character of the buildings admitted, which was but seldom, as wood and stone entered largely into the construction of the great proportion of all buildings.

The inventive genius of the new nation was not much stimulated to improving on the manner of the mother country in the production of bricks. In fact, those which we then made were poorly moulded and burned, and compared unfavorably with the common building bricks of English and Dutch manufacture. But at the present time, both for quantity and quality, we have no equal in any nation of the world, and for this we are largely indebted to the American patent system, which greatly fosters and encourages development in this line, as in other and kindred arts.

Improvements in modes or machines for manufacturing common bricks received but little attention until about 1840; previously they were more remarkable for being unique in some special point of but small importance than for any generally good achievements; that is, no attention was paid to the resulting brick after it came from the kiln; the whole idea seemed to be to shape or mould it in some manner. For instance, one machine was made like a box now used by plasterers to run off their lime; it was elevated slightly, and the mud, which was mixed in the box, allowed to pass through a grate into a large framework having sides about three inches high, and divided by wires stretched the length and across it, which laid upon the bottom, and when the clay in the shallow box was somewhat hardened, the wires were raised and the bricks thereby cut and formed into shape. The box, when emptied of the clay, could be easily moved on wheels running on a plank gangway to the next shallow mould-box, and so on. But the slush stock made in this way was very inferior; it would dry unequally, be full of cracks, and was subjected to no packing, as in the pug-mill, or pressure, as by machines of to-day, or a blow, as is done by the hand-moulder, who dashes the tempered and packed clay into the mould with great force, and again forces it down and closer together with the hands and plane. When the bricks came from the kiln they were light, very open or porous, therefore absorbed water readily, and were entirely unfit for building purposes.

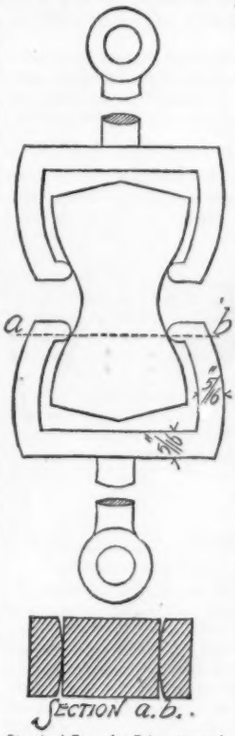
But the brick-machines now in use have remedied these great objections in almost every particular, and have been brought to great perfection, so as to produce quickly large quantities of bricks from crude clay, in all conditions of plasticity, as well as in all stages of dryness.

Inventors are now turning their attention to improvements in methods for burning bricks, which is a good field, as the old open Dutch kilns so commonly employed is one of the most wasteful processes of manufacture that has endured for nearly two thousand years without improvement.

CHARLES T. DAVIS.

PRELIMINARY REPORT ON A UNIFORM SYSTEM FOR TESTS OF CEMENT.[1]

TO THE AMERICAN SOCIETY OF CIVIL ENGINEERS:—



Standard Form for Briquette and Clips.

YOUR committee appointed to devise a uniform system for tests of cement respectfully submits the following preliminary report:—

In response to the request of the Secretary of the Society, made last year, samples of mortar-sand have been received by the Chairman of said Committee, kindly sent by members from localities indicated in an appendix to this report.

It will be observed that no samples have been received from the Pacific slope or from Canada.

The purpose of the Committee in making this collection is that a standard sand may be found in deposits somewhat widely distributed over this continent, that will give uniform results in mortar tests; therefore, it is quite desirable to secure typical sands from regions not covered by the samples received, before commencing any mortar tests of the sands at present collected.

Bearing in mind the labor and time necessary to make such collection and examination, we feel that it is due the Society that a mode of testing should be formulated and recommended for adoption, without further delay, as follows:—

I. In selecting samples of cement for experimental purposes, take the same from the interior of original packages at sufficient depth to insure a fair exponent of quality, and store the same in tightly-closed receptacles impervious to light or dampness until required for manipulation, when each sample of cement should be thoroughly mixed by sifting or otherwise, that it may be uniform in character throughout its mass.

II. Ascertain the per cent by weight of each sample that is rejected by sieves of 2,500, 5,476 and 10,000 meshes to the square inch respectively, the first-mentioned sieve being of No. 35, the second of No. 37, and the third of No. 40 wire gauge.

III. For tests of mortar composed in part of sand, the sand should be sharp, well washed and dried, rejecting all that will not pass the sieve of 400 meshes to the square inch, and that will pass a sieve of 900 meshes to the square inch; the wire gauge of the former sieve to be No. 24, and of the latter No. 28.

IV. The proportion of sand for mortar of each briquette should be carefully determined by weight, and thoroughly and intimately mixed with the cement in a dry state before water is added, and, so far as possible, all the water of mixture should be added at once that is necessary to produce the desired consistency of the resulting mortar, and thereafter the manipulation by the spatula or trowel should be rapid and thorough, and care should be taken to introduce the mass into the mould and complete the moulding process before incipient setting begins.

[1] This paper was presented by the Committee at the Annual Meeting of the American Society of Civil Engineers, January 16, 1884, as a preliminary report, and was accepted as such by vote of the meeting, the Committee being continued The committee was as follows: Messrs. D. J. Whittemore, J. Herbert Shedd, Q. A. Gillmore, Alfred Noble, F. O. Norton, W. W. Maclay, Eliot C. Clarke. Republished from the *Transactions* of the American Society of Civil Engineers.

V. Ordinary fresh and clean water having a temperature acquired when exposed in open vessels in an atmosphere ranging between 60° and 70° Fah. should be used for water of mixture and immersion of moulded samples.

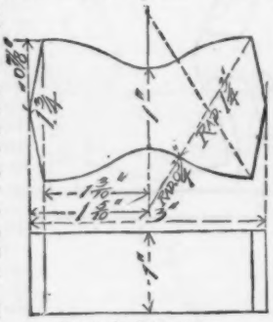
VI. For determination of strength, tensile tests are recommended; and the form and size of briquettes and clips to be used, shown by the cuts, are thought proper for this purpose.

VII. It is desirable that the bulk of given weights of cements be ascertained, and the following method is recommended for that purpose: Procure a cylinder six inches long, having an interior section equal to an area of two square inches. Sifting the cement to be measured so that it may not be compact, weigh carefully five ounces if of Portland cement, and four ounces if of American hydraulic cement, and pour the same into the cylinder, which should stand upright with its lower end resting upon a close-fitting and suitable base; then, without shock or sudden impact lower a closely-fitting piston, moving without friction, slowly down the cylinder on to the cement, said piston and its attachments to weigh exactly fifty pounds. After resting thereon for one minute, remove the same and ascertain the bulk of cement thus compressed. When sand is used in the fabrication of mortars ascertain the weight of an equal bulk of sand to that of the cement used in connection therewith, said sand to be shaken until its bulk remains unchanged before weighing.

VIII. In applying stress on briquettes do not allow in the commencement a strain to exceed one-half the estimated breaking strength of the best piece, and thereafter increase the same regularly at the rate of about two hundred pounds per minute until rupture takes place. If it is desired to compare the strengths of cement broken by different testing-machines, it is recommended to compare the machines themselves by breaking similar lots of briquettes on each, in order to determine their peculiar differences.

IX. For Portland-cement tests, the following method is recommended: Take enough cement to make five briquettes, one part cement, three parts sand, by weight; ten briquettes of neat cement and two cakes of neat cement two or three inches in diameter, about one-half inch thick, with thin edges.

X. Note the time in minutes that these cakes, when mixed with water to the consistency of a stiff plastic mortar, take to set hard enough to stand the wire test recommended by General Gillmore, viz.: one-twelfth-inch diameter wire loaded with one-fourth of a pound, and one-twenty-fourth-inch diameter wire loaded with one pound. One of these cakes, when hard enough, should be put in water and examined from day to see if it becomes contorted or if cracks show themselves at the edges. This is the test to show if the cement remains constant in volume, and is very important. The remaining cake should be kept in the air and its color observed, which for a good cement should be a uniform bluish-gray throughout, yellowish blotches indicating poor cement. The color of the cement when left in the air indicates the quality much better than when the cement is put in water.



Details for Briquettes.

XI. Make five briquettes composed of one part of cement and three parts of sand (by weight). Also make ten briquettes of neat cement; the moulds in each instance, while being charged and manipulated, to be laid directly on glass or slate, or some other non-absorbent material.

XII. The proportion of water, by weight, for the neat cement should be from 20 to 25 per cent or more, according to the fineness, age or other condition of the cement and the temperature of the air.

XIII. The desired mixture is a stiff plastic mortar, and when reached under certain conditions a very slight addition of water will sensibly diminish the tensile strength, especially for the seven-day test. As the age of the briquettes increases the injurious effect of too much water in gauging is less marked. When gauged, one part cement to three parts sand, by weight, the water required should not vary much from ten per cent of the combined weight of the cement and sand.

XIV. The moulds, when filled, should be pressed down firmly and struck off level; uniformity in this operation can only be obtained by practice. A damp cloth should be kept over the briquettes until they are hard enough to immerse in water.

XV. The moulds should be removed when the briquettes are hard enough to stand it; and for the sake of uniformity, the briquettes, both of neat cement and mixed with sand, should be immersed in water at the end of twenty-four hours.

XVI. The briquettes should always be put in the testing-machine and broken immediately after being taken out of the water, and the temperature of the briquettes and of the testing-room should be constant between 60° and 70° Fah.

XVII. Half the neat cement briquettes should be broken at the end of seven days and twenty-eight days respectively, and all the briquettes gauged, one part cement and three parts sand, should be broken at the end of twenty-eight days, in order to determine the tensile strength of each from the average of five breakings.

XVIII. For making tests of American hydraulic cements the following method is advised — using the standard mould and clutch advised for Portland-cement tests: —

Take enough cement to make ten briquettes of neat cement, five briquettes one part of neat cement and one part of sand, by weight, and two cakes of neat cement, two or three inches in diameter, about one-half inch thick, with thin edges.

XIX. Treat and observe the two cakes the same as for Portland cement; the cake kept in the air will be of a uniform color for a good cement, light or dark, according to the character of the rock from which the cement is made.

XX. Make five briquettes composed of equal parts, by weight, of cement and sand, the moulds being laid directly on glass, slate or some other non-absorbent material during moulding.

Also make ten briquettes of neat cement, using only sufficient water to make a stiff plastic mortar (the moulds being laid on glass or slate as before stated), and when filled to be pressed down forcibly and struck off level, and otherwise treated as specified for Portland cement until immersed in water, which immersion should take place as soon as removed from the moulds.

XXI. The briquettes should always be put in the testing-machine and broken immediately after removal from the water, and the temperature of the briquettes and of the testing-room should not exceed 70° nor be below 60° Fah.

XXII. Half of the neat cement briquettes should be broken at the end of twenty-four hours, and the remainder at the end of twenty-eight days, and all the briquettes composed of equal parts of sand and cement at the end of twenty-eight days, and from these results the average strength to be determined in each series of tests.

XXIII. Admitting the desirability and value of the twenty-four-hour tests of neat cement briquettes, we esteem of still more value the twenty-eight-day tests of similar briquettes in connection therewith, as showing continued activity, and as affording an index of ultimate energy.

THE ILLUSTRATIONS.

THE "SANITARIUM" BATH HOUSE, HOT SPRINGS, ARKANSAS, MESSRS. J. L. SMITHMEYER & PAUL J. PELZ, ARCHITECTS, WASHINGTON, D. C.

THE thermal waters of Hot Springs, Arkansas, have of late years become widely known on account of their great curative virtues, and it is easy to foretell that this watering place, at present with a visiting population of nearly four thousand and a permanent population of seven thousand, will in time become one of the most famous of the world. The seventy springs debouch from the easterly side of a narrow valley, running nearly due southward at altitudes averaging from ten to seventy-five feet above the level where the waters are used for bathing purposes, and yield about 500,000 gallons per day.

The United States Government has reserved the springs and the ground on which the springs and bath-houses are situated, and collects the seething waters (110° to 146° Fahrenheit) in reservoirs on the mountain side, and leads it in cast-iron conduit pipes to the bath-houses in the valley. The bath-houses have been put up by private parties under leases from the Government under certain conditions, and subject to the authority of the Department of the Interior. The lessees furnish baths to patients at a certain limited cost per bath. Most of the present bath-houses are built of wood.

The structure shown on the illustration will be located between the "Old Hale" and the "Independent" bath-houses, nearly central in the row of houses of similar function; it has a frontage of sixty-seven feet by a depth of one hundred feet, partly extending into the hill-side. It will contain forty bath-tubs with the necessary vapor-boxes and plunge-baths. The tubs will be of white porcelain. The vapor-boxes are used for steaming patients, who assume a sitting posture and are wholly encased except the head. Each bath-room is furnished with a lounge for the patient to rest on after the bath.

The "Sanitarium" bath-house has been arranged for the separate accommodation of both sexes. The baths for men are on the ground floor, those for women on the second floor. The third floor of front building, on the easterly end of the second floor, contains apartments for taking sun-baths, which, following the suggestions of the highest medical authorities, will be used in conjunction with the hot-water baths. The roofs of these apartments contain large skylights. The disposition of the various rooms is apparent from the ground plans. The office has been located so that the clerk can attend to his duties for both departments, and the elevator will be arranged for the independent transport of patients of either sex to the upper stories. There is also a staircase from the first floor to the sun-baths on the third story.

The hot water, after being tempered in tanks on the mountain terrace, is led directly to the tubs, etc., in the ordinary manner. The waste is taken into the creek, which is now converted into a sewer by the Government; it is arched over, and its top will hereafter form part of the main street.

The "Sanitarium" will be built of the bricks made at the place, with pressed-brick arches and belts, stone sills, lintels and copings, and slate and tin roofs. It will be built during the next season, and will cost about $30,000.

HOUSE FOR MRS. MORNINGTON SMYTHE, WASHINGTON, D. C. MR. W. CLAUDE FREDERIC, ARCHITECT, BALTIMORE, MD.

The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 26. SATURDAY, AUGUST 2, 1884. Volume XVI. No. 449.

SANITARY PLUMBING FIXTURES.

In this issue of the *American Architect* we print a sectional view of a bath-room fitted up with C. H. Moore's Patent Sanitary Plumbing fixtures, including "Eclipse" Water-Closet, Moore's Flow Basin-Valve, and Bath-Valve, and Bath with end strainer.

This system is the most practical and positive seal against sewer-gas escaping into our houses, yet put in the market. By this system the extreme end of each waste-pipe connecting with the plumbing fixtures is plugged with a solid brass valve, thus preventing the escape of sewer-gas, siphoning and evaporation of water from the traps.

It is now generally known that traps are in many cases siphoned out by *capillary attraction*, (and ventilating the traps will not prevent it).

This is an experiment that should interest every person: place a wet strand of worsted, ravellings of cloth, string, hair, paper or such like articles, that are liable at any time to stop on the bend of a trap, in a vessel of water, and it will convince you how quickly water is removed from a water-seal trap by a process that is continually working after the accumulation of hair or lint, or the *spongy fungus* growth on the inner walls of the trap and waste-pipe, and is a practical evidence, beyond a doubt, that a water-seal trap *of any kind*, no matter how well ventilated, is only worthless security against sewer-gas, and that it is simply inconsistent for any one to depend upon a water-seal to barricade them from an enemy that is sure to produce sickness if the air is contaminated by it. If with the use of C. H. Moore's patent plumbing fixtures traps are emptied by capillary attraction, it will be impossible for sewer-gas to find its way into the houses because the overflow pipes are dispensed with, and the extreme end of each water-pipe is plugged with a brass ground-seated valve (and always submerged with water), connected with a brass float which works automatically, lifting the valve in case of an overflow, and allowing the surplus water to escape under the valve to the waste-pipe. Moore's patent "Eclipse" water-closet is the only water-closet in use that does not depend on water-traps, having its security against sewer-gas within itself. Moore's No-Overflow Basin-Valve is a complete fixture; by its use the objectionable plug and chain and overflow pipe are dispensed with. It is placed at the back or side of bowl and connected with a silver-plated strainer to bowl; when the water in bowl reaches a certain height, the pressure of water lifts the brass float, which is connected by a brass spindle to the valve, and thereby takes care of the overflow automatically, the valve being placed at end of waste-pipe cuts off all vent, and thereby renders it impossible to siphon the trap, and plugs out sewer-gas, beyond a doubt.

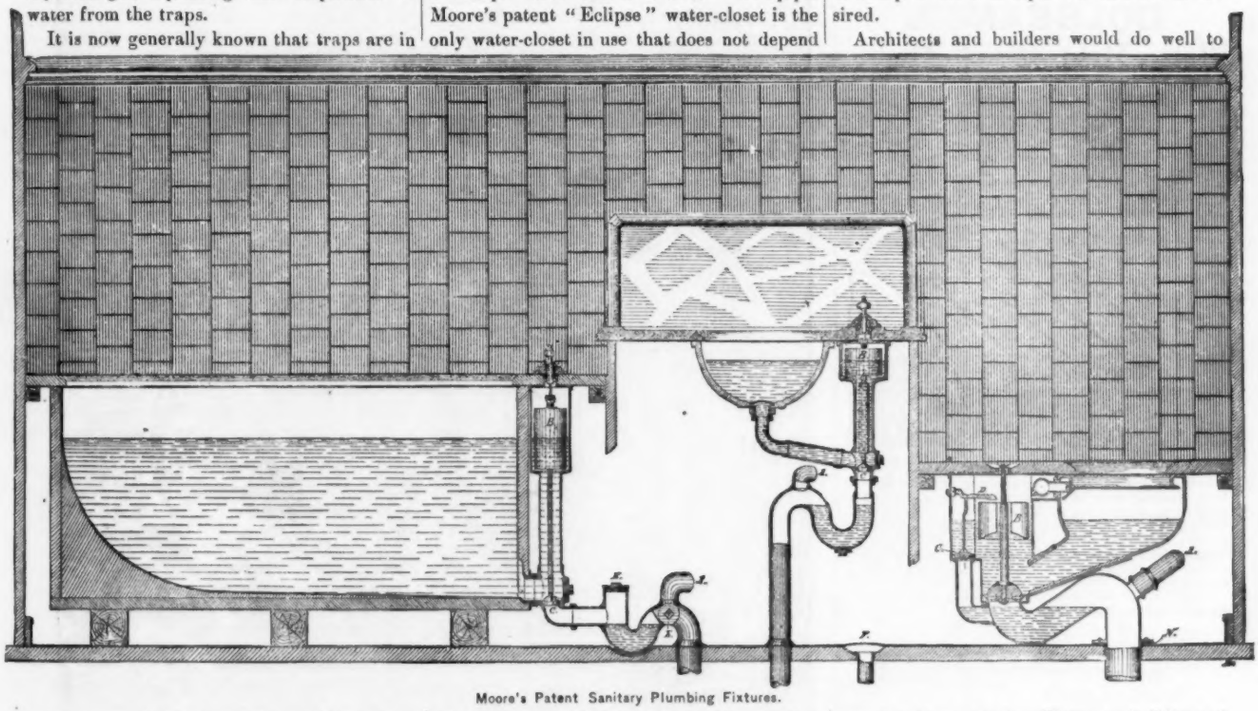
This valve is also made in connection with a patent soap-dish, which is recessed in the marble slab, the piece of valve passing through the centre of dish, so at pleasure you can lift soap-dish and float through the slab; with the use of this soap-dish the portable soap-dish is not required.

With the use of C. H. Moore's Patent Bath-Valve and Bath, which has the discharge outlet at the end of tub (and not at bottom as all others have), the trap can be placed above the safe and not under the floor, as is now the universal custom; so if a leak occurs no damage can be done provided there is a lead safe under the fixture. Every drop of water will drain from the tub, and the supply is brought in at top of tub or at top of end strainer as desired.

Architects and builders would do well to examine these goods. The new building of the Mutual Life Insurance Company, of New York city, has over one hundred and fifty of these valves. Some of the larger apartment-houses now being built in New York city are introducing these goods. The Board of Trade Building, Chicago, will be supplied with over one hundred of the basin-valves.

For further information apply to the manufacturers,

WASHBURNE & MOORE MANUFACTURING Co.,
YONKERS, N. Y.



Moore's Patent Sanitary Plumbing Fixtures.

ELECTRIC BELLS AND APPLIANCES FOR APARTMENT-HOUSES AND HOTELS.

In no branch of the building and equipment of the Apartment-House, as now constructed, is there more experience required than in the

proper application of a suitable system of Electric-Bells, Speaking-Tubes, etc. — a system so arranged as to give perfect communication from the main office to each suite or apartment and from them to the office, so that questions can be asked and orders given without noise or confusion. The building should be arranged so that all supplies can be distributed from the basement by a separate elevator. To facilitate giving and receiving orders each kitchen is connected by a speaking-tube and bell, an annunciator placed in the basement being connected with the different kitchens, thus enabling the janitor to see at a glance the family requiring attention.

One of the firms who have made this branch of work a specialty, Edwards & Co., of 41 Beaver St., N. Y., have introduced several improvements that are being generally adopted. They connect the annunciator as a burglar-alarm, putting the switches that control each suite in a case that can be securely locked, so that if occupants wish to leave for a short time, or for the summer, they have simply to notify the person in charge, who will connect their suite with the alarm, thus affording perfect protection in their absence, as no one can enter without giving an alarm, even if they have a key. The "Florence House," 4th Avenue and 18th St., has had this improvement put in for the security of its guests.

They have contracts for several new houses, in which, among other improvements, they are introducing their system of lighting gas by electricity in the halls, parlors and public places, where employés would otherwise have to use matches, thus avoiding all danger of fire by their use. Their fire-alarm system notifies the office if a fire should break out in any part of the building, and by simply pressing a button, any or all parts of a house can be warned.

Edwards & Co. refer to many of the finest buildings in New York city, such as the "Knickerbocker," "Fifth Avenue," "Hawthorne," "Central Park," etc.

Having been many years in this line of business, their experience enables them to do everything to make their work satisfactory; and one reason of their success is the great care taken to protect work from interference and injury. Having all conveniences for manufacturing they are enabled to fill all orders promptly.

EDWARDS & Co.,
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Thos. Kelly & Bros., Manufacturers and Patentees of Kelly's Self-Acting Water Closets, Kelly's Self-Acting Urinals, the Kelly Stop and Waste Cock, and everything appertaining to its different applications, have removed to 75 Jackson Street, third door west of State Street, Chicago.

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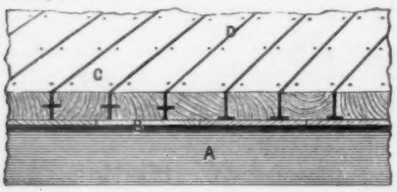
Architects and Builders will find in Dolbeare's Water-Tight Wood Floors an improvement long sought for, combining lightness, durability, and absolute water-tight qualities. For horse-car, livery, and private stables, it is rapidly taking the place of caulking or concreting. For slaughter-houses, currier's shops, factory floors, bridges, etc., it is highly recommended. In first-class stores, hotels, and public buildings, by the use of this floor it is absolutely impossible for goods or ceilings to be damaged by water leaking through the floor in case of fire, bursting of water-pipes, etc.



Patented June, 1882.

In the above cut an end or sectional view is shown, B representing a 7-8 matched boarding on Floor Timber, A, C showing a 3-inch planking with 3-8 Rabbetting or Groving (this can be laid in thickness from 1 inch, upwards), and D showing the Filling in the seams, applied hot, which, when set, is thoroughly adhesive to the wood and sufficiently elastic to allow for any ordinary shrinking, swelling or settling.

Orders respectfully solicited, and personally attended to, by addressing

W. L. DOLBEARE.
Atlantic Avenue, Fort Hill Wharf, Boston.

MIDDLESEX HORSE RAILROAD COMPANY.
Boston, June 14, 1882.

W. L. Dolbeare, Esq.

Dear Sir: — It affords us pleasure to recommend your process for "Making Floors Absolutely Water Tight." In our new Bunker-Hill Stable, where we have stalls on three floors (one directly over the other), it has given the most perfect satisfaction, and makes no extra strain upon the walls of the building, as would be the case if the old method of "Caulking" was resorted to. In very many respects I regard your floor as very much superior to any caulked floor. Very truly, Charles E. Powers, Pres.

SAMUEL D. KELLEY, ARCHITECT.
Boston, June 21, 1882.

W. L. Dolbeare, Esq.

Dear Sir: — I have used Dolbeare's Improved Water-Tight Wood Floors for stable purposes to the extent of about fourteen thousand (14,000) square feet, and they have given complete satisfaction. I consider it superior to caulking or other Improved Water-Tight Floors. Yours, &c.,
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Block of Seven Houses · St Paul · Minn.
George Wirth Architect

No. 449 American Architect and Building News, Aug. 2 1884

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Design for Residence at Washington.

for Mrs Mornington Smythe.

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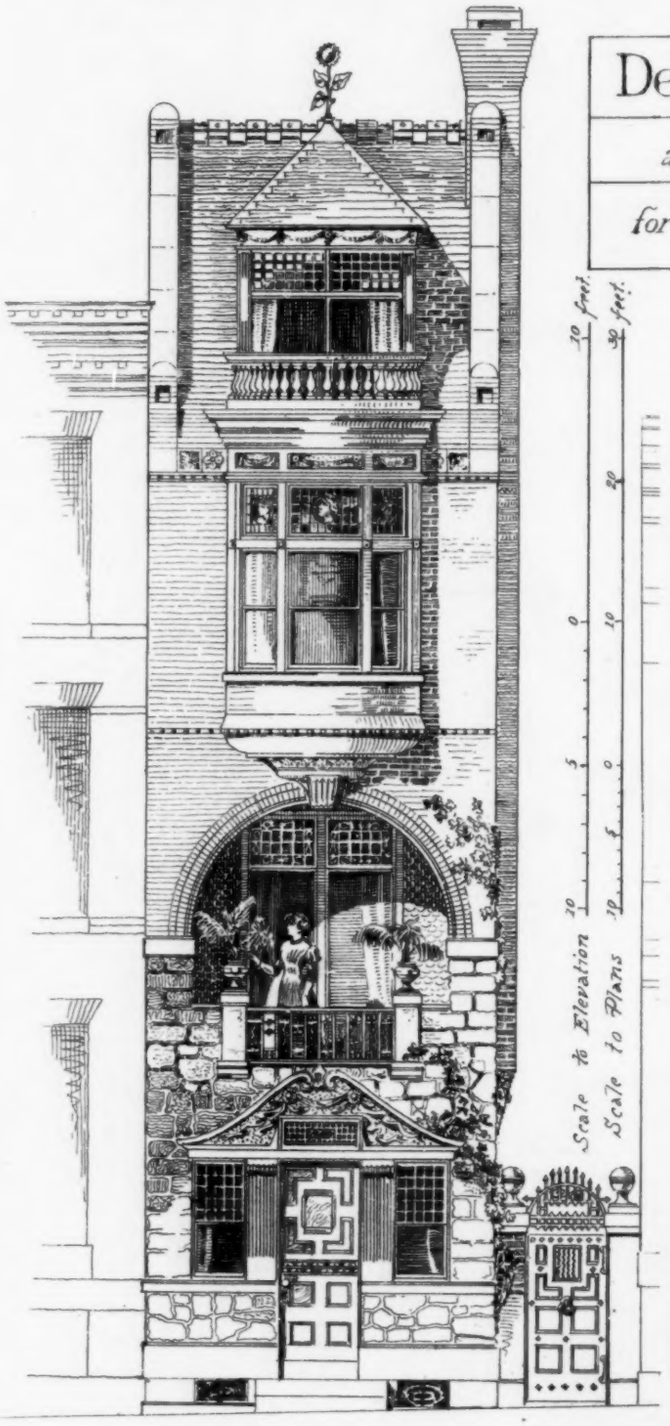
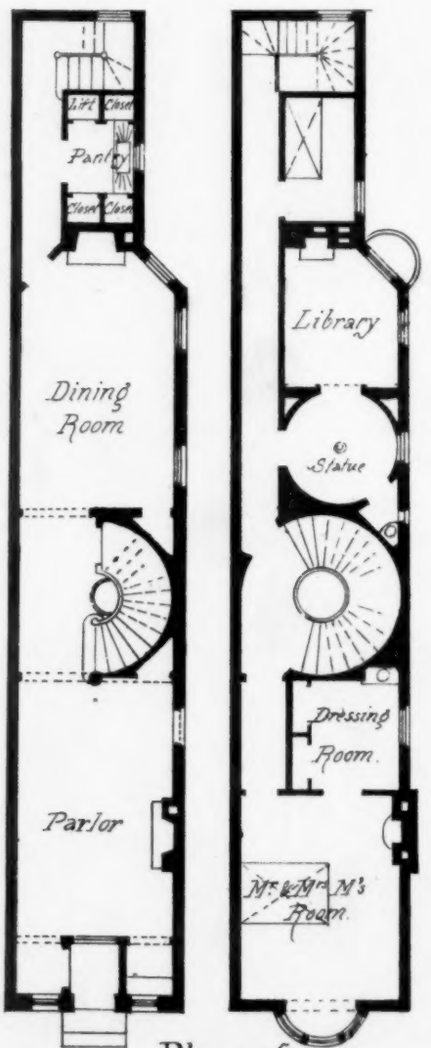


Scale to Elevation 10 5 0 10 20 30 feet.

Scale to Plans 12 8 4 0 10 20

·Elevation·



Plans of
·First·Floor & Third·Floor·

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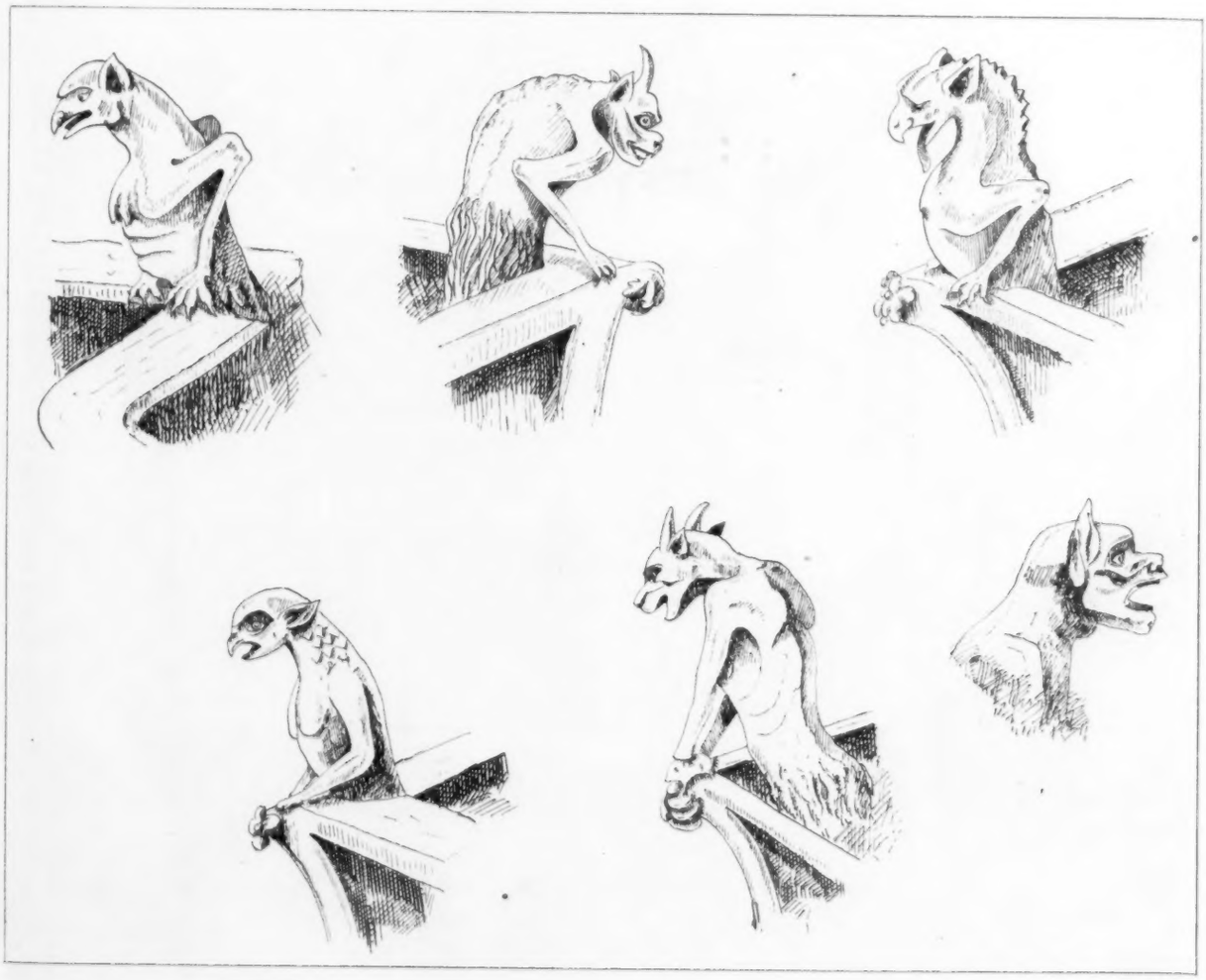

SOME OF THE ANIMALS ON THE GALLERIES OF THE TOWERS OF NOTRE DAME IN PARIS.

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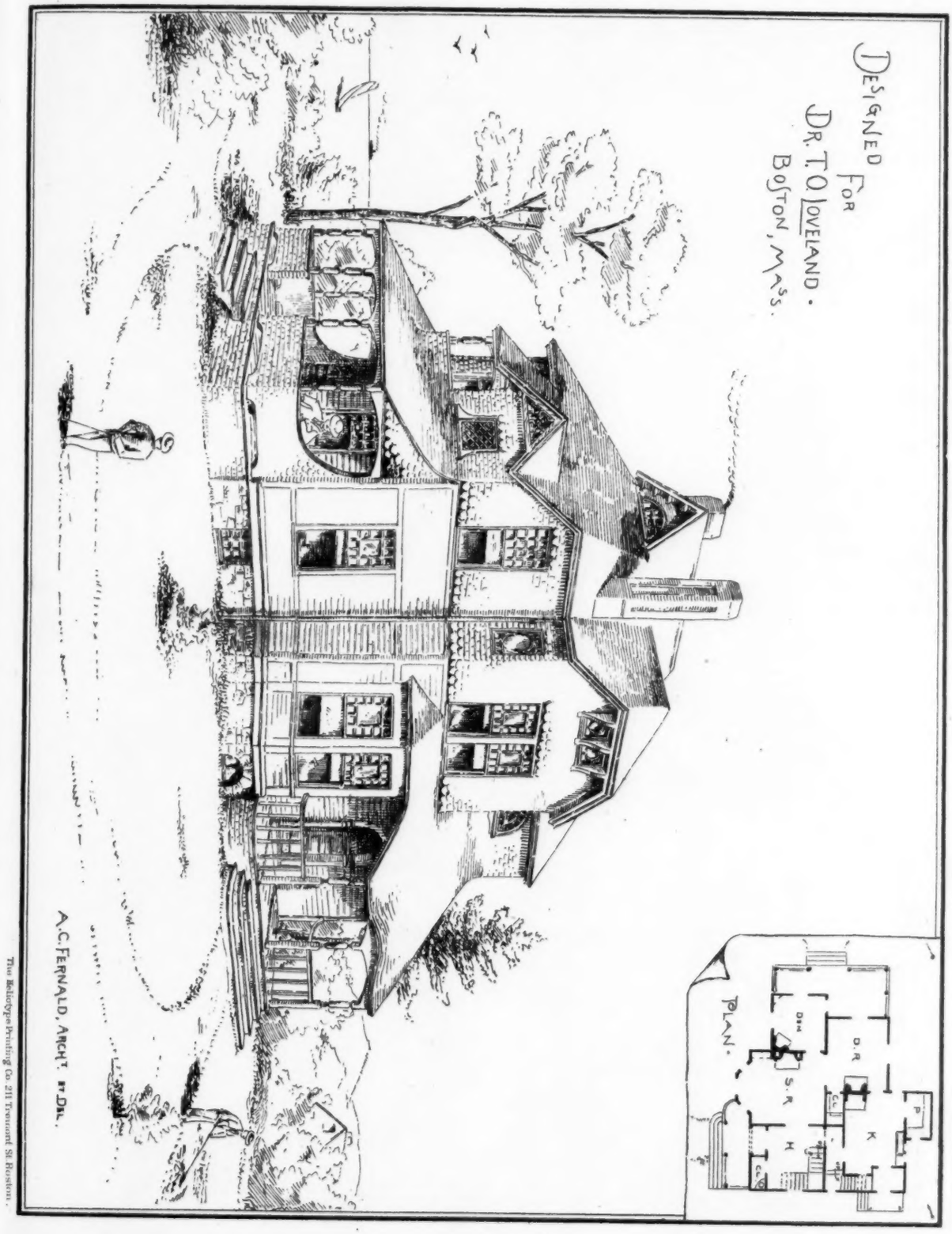

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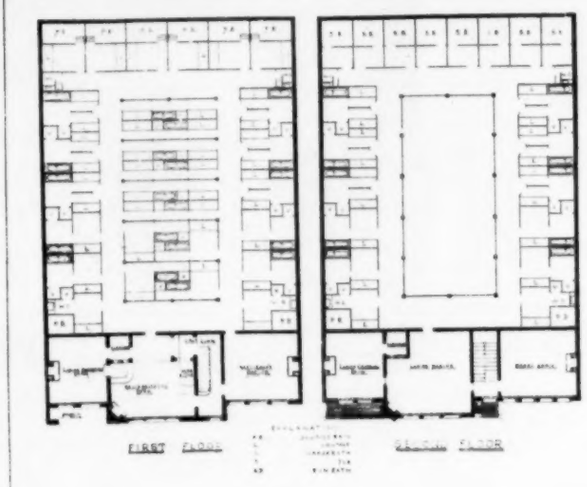

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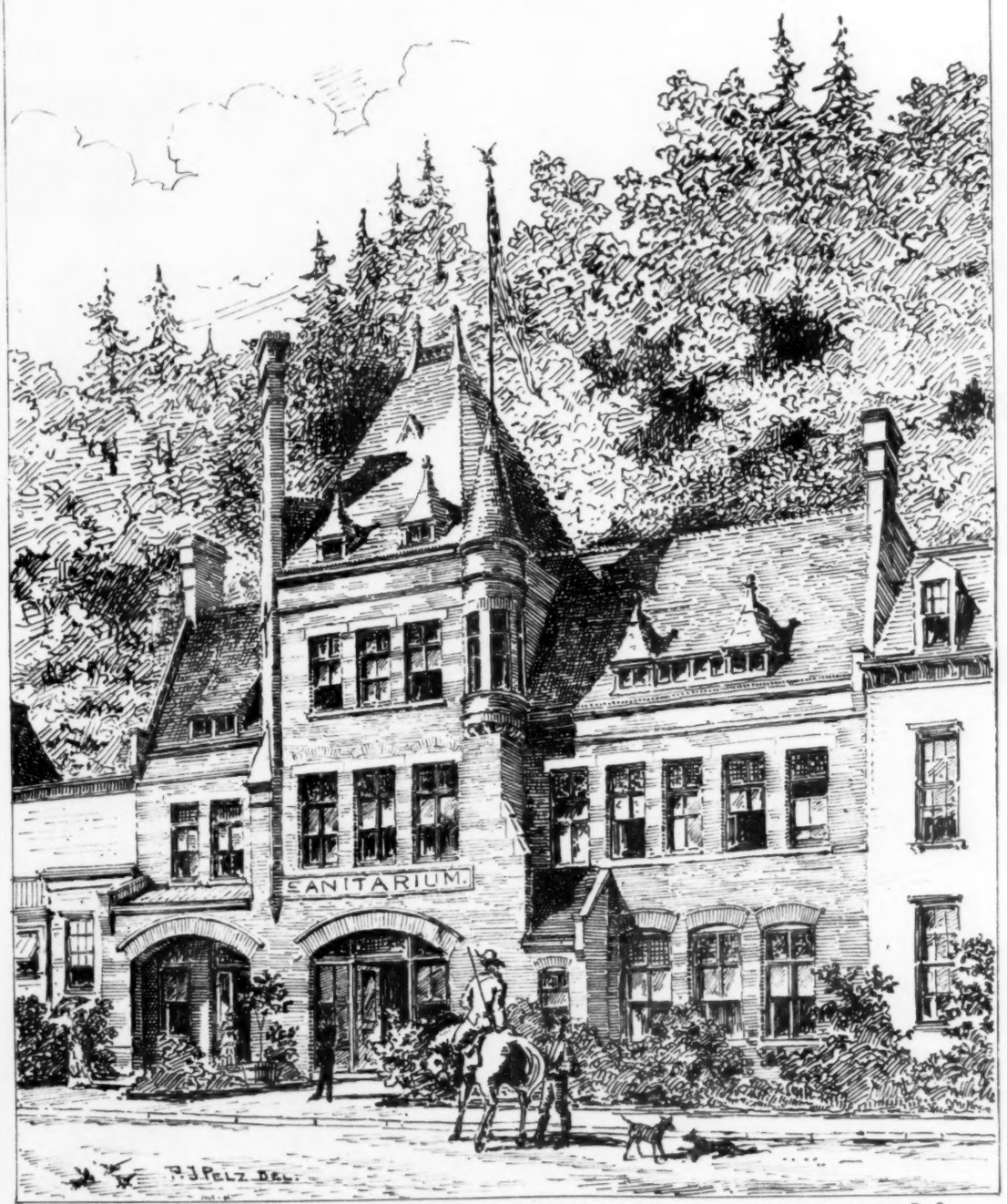

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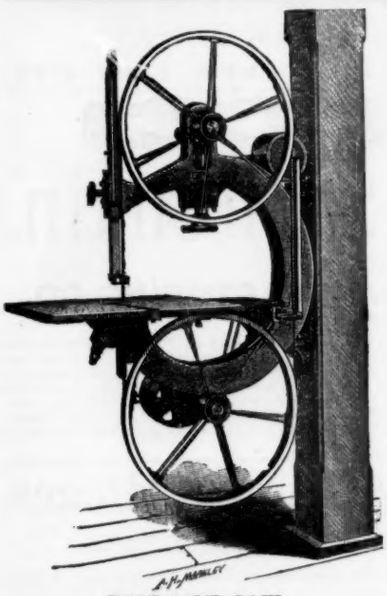

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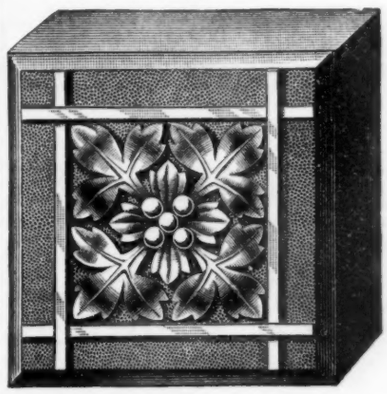

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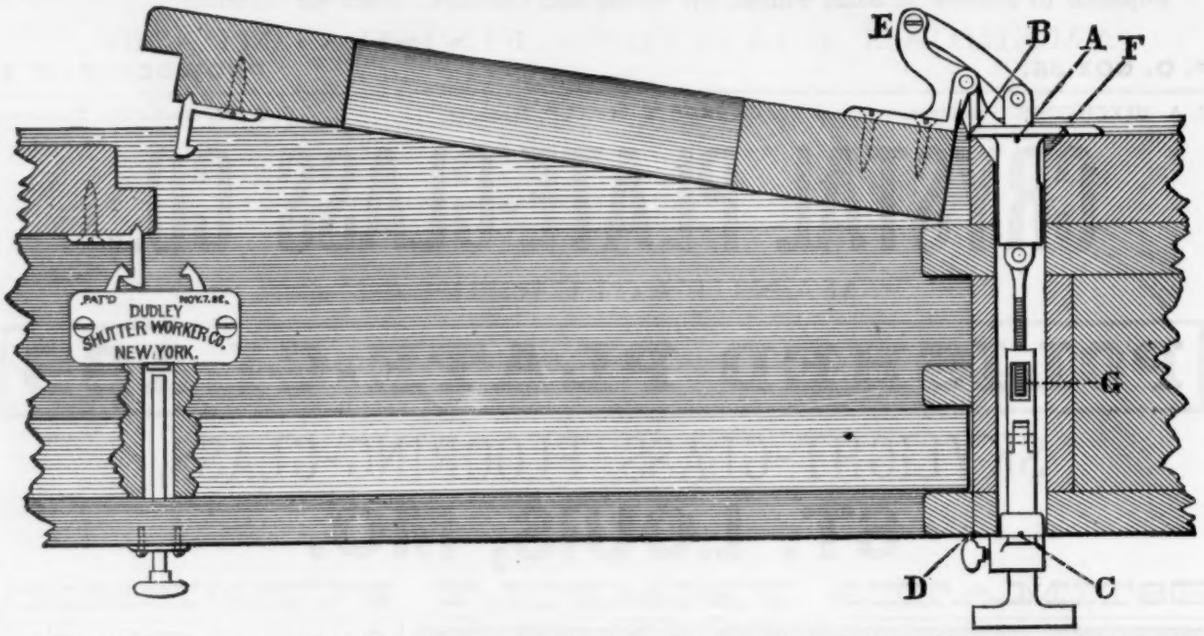

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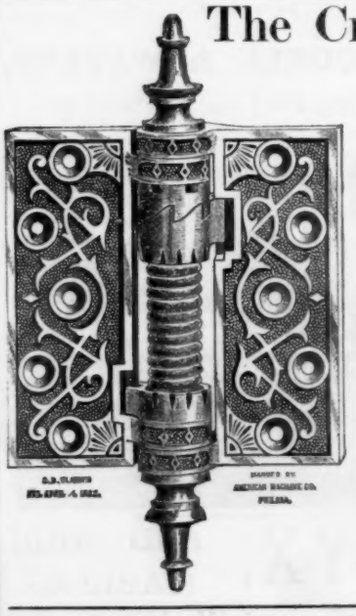

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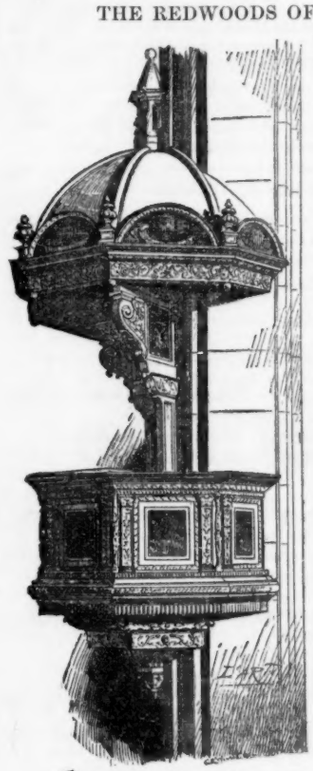
SOME ANIMALS ON THE GALLERIES OF NOTRE DAME, PARIS, FRANCE. SKETCHED BY MR. M. K. KRESS.

THE REDWOODS OF CALIFORNIA.[1]



PULPIT. DESIGNED BY MATTEO CIVITALI. CATHEDRAL of LUCCA, ITALY.

THE redwood, known to botanists as *Sequoia sempervirens*, is quite minutely described in "*Forest Trees of California*," a pamphlet issued in 1882 from the State Mining Bureau. The foliage "is like that of the yew — the same flat and final starry spray or twiglets of small leaves, say one-half to one inch long, distinctly in two rows, flat and line-like, with a sharp point; dark green above, soft grayish-green underside. The limbs are spreading or drooping; cones of an oblong shape, from one to one and a quarter inches long, and one-half to three-quarters of an inch thick, consisting of numerous trapezoidal-disked scales, with three to five flat, oval or obovate, dark reddish-brown seeds to each scale. The wood is red, with a faint coppery or metallic iridescent gloss, the hues deepening to richer, darker shades with age. Choice curl-grained wood is very ornamental for cabinet-finishing and similar work — takes a fine polish with a simple stain or varnish. Well-matured heartwood of the base of these trees is so solid and heavy as to sink in water. These will last for ages under the most trying circumstances, like cedars and yews. Insects seem never to trouble any of it. The bark, reduced to bast, has been utilized for upholstering — an excellent material." The bark of the redwood has a soft, fine fibre, and is of a spongy nature, the color being a rich reddish-brown, turning to a soft gray at exposed parts. It is usually deeply seamed, especially in old trees, and it is no uncommon thing to find it from twelve to eighteen inches in thickness.

"Redwoods abound chiefly, if not entirely, on sand-stone soil, and are always confined to the fog limits of the coast — say fifteen to thirty miles inland, and probably never exceeding forty or fifty miles even in the most favorable parts of the low Coast range, where the fog passes over low land or through open gaps. These mighty redwood wands possess a magic power over passing fogs, precipitating them in showers of rain at their feet. For this mainly, among other good reasons, living springs of the purest water ever bubble and babble at their bidding."

This is, perhaps, one of the secrets of the monstrous growth of these forests; for the dryest summer (and the summer months bring little or no rain in this region) has no appreciable effect upon the deep, rich soil in the shade of their protecting arms. The temperature is even, and high enough to convert the forest into a vast hot-house, in which all plant-life flourishes. The various fruit-bearing bushes — the blackberry, salmon-berry, thimbleberry, salalberry, and the like — attain remarkable proportions, while the sword and common ferns grow to monstrous size, often reaching a height of ten feet or more.

[1] Extracts from an illustrated pamphlet by W. G. Bonner, issued by the California Redwood Company, of San Francisco, Cal.

The redwoods extend along the northern coast of California from a little south of the Oregon boundary to the northern part of Monterey County, a distance of more than four hundred miles. The *Forestry Bulletin* (No. 13), published by the Government, gives a map showing the position of the belt, its dimensions and its variations as to density of growth and capabilities as to timber production. From this map and accompanying tables, it appears that the southern extremity of the belt is of no importance, and does not figure as a lumber-producing region. There is, however, a small body of timber in Santa Cruz County. With this exception there is no redwood for lumbering purposes south of Russian river, which empties into the Pacific perhaps one hundred miles north of San Francisco Bay. . .

The manufacture of redwood lumber has been going on in a quiet way for more than a quarter century; but men did not recognize its real value at first, and had but a vague idea of the vast supply in store. Besides, the demand heretofore has been easily met by mere trimmings, so to speak, from the edges of the forest. So the forest itself has remained — a legacy of untold value — for the use and profit of the present generation of hungry men. But its wealth is not limited to a gold value alone; for within its deep recesses the curious will find more to speculate on, and the lover of nature more to enjoy, than can be described in these pages. It is a perfect wonder-land — ever new, ever enchanting, and so wholly above and beyond any ordinary forest land in its attractive features as to pass the comprehension of the unacquainted. Rarely indeed does one find a listener who will accept the dimensions of the sylvan monarchs he has met with. The stranger may allow a ten-foot tree, say once or twice in a day's tramp; but when you tell him of measuring any number of trees of forty or fifty feet in circumference you are wasting time, and possibly losing confidence in your own veracity, so decidedly is it questioned. Yet larger trees than these are met with everywhere in the forests of Humboldt County, and may be seen and measured by any one who will take the trouble. There is a "fallen monarch" in the Freshwater forest, some twelve miles from Eureka, whose throne was undermined by the little brook at his feet. It lies across the stream, making a bridge, along the entire length of which any stage coach might drive with ease and safety. Twelve feet above the surface roots its girth is sixty-three feet; and two hundred feet above the circumference is thirty-six feet. The length of the log is about three hundred feet, the top having been destroyed by the falling of the tree many years ago. There was a few years ago — I am told it has been washed away by winter freshets — a fallen redwood in the northern part of the county that was turned to good account by the packers of that section. The tree had fallen across a deep gulch near the turbulent Klamath river, along the trail to Orleans Bar. It was utilized as a bridge, by means of which pack-trains and travellers regularly crossed the troublesome gulch for years. . .

Architects and builders, and wood-workers generally, have moved slowly in their experiments with redwood, as if they were not quite sure of their footing. But the ordeal has been passed, and it seems quite safe to say that no wood known to commerce is so well adapted to the general use of man. In its early history its use was carried no farther than house-building in a cheap way. Little by little it made its way into favor, its numerous good qualities gaining for it a preference among those who had believed only in pine and other woods known in their Eastern homes. The shingles and shakes made from redwood began to attract attention by reason of their lasting qualities, and in time they came to be rated A 1, and were finally accepted as the very best roof-covering to be had. Redwood shingles were recently taken from a roof here after twenty years' service and sent to San Francisco as a sample of their good qualities. They had neither decayed nor shrunk nor warped! In this country pine or other shingles are never met with, so completely does redwood answer all requirements. The manufacture of these shingles is carried on very extensively, almost every lumber mill having machinery for that purpose. Redwood was first introduced in the Eastern States in the shape of shingles. Now car-loads and cargoes of them go regularly to New York and other Eastern markets, where they have met with much favor. From this has sprung up a lively demand for all descriptions of redwood lumber. A great drawback has been the excessive freight rates across the continent; but even with this disadvantage the trade is rapidly developing in that direction. Woodworkers in the East, as well as here, seem to have decided that redwood is good enough for all purposes, and it is being used wherever a light, yet strong and durable, wood is wanted. Its deep, rich color, and its being susceptible of the highest finish, make it especially desirable for inside housework, as well as for car-trimmings and the like. Another important feature is the fact that when seasoned, redwood shrinks and swells less than any wood in use; in fact, it may be said not to shrink at all, if the experience of builders is worth anything. It may also be set down as a fact that insects and vermin will not abide within the walls of a redwood building. This, at least, is the testimony of householders; and I am sure that I have never met with nor seen evidence of any of those midnight raiders so plentiful in the country taverns and fine hotels in the East. In Peru and Chili there are ants and other insects which destroy the native woods, as well as pine and other kinds of wood from this country; but redwood is never molested — a fact which is thoroughly appreciated in those countries, and which has helped to build up a large trade there. The wood has little or no pitch, and is not combustible like pine. Neither has it any odor. . .

The government estimate of (board measure) timber standing in

the redwood belt in the census year 1880 was 25,825,000,000 feet. This was made up from estimates furnished by a few lumbermen, whose opportunities for making a fair estimate cannot be questioned. But it is also true that many others, including millmen and lumbermen, estimate from fifty to one hundred per cent higher, and taking the estimated area of the belt from Russian river to the Oregon line with the estimate of timber standing, we shall find even their figures largely increased. The two hundred and seventy-five miles covered by this portion of the belt multiplied by the least estimated width (fifteen miles) gives 4,125 square miles. A square mile contains 640 acres, and the average yield per acre (according to government estimate) is 50,000 feet, which would give 32,000,000 feet to the square mile. This would give as a total for the 4,125 square miles 132,000,000,000 feet of standing timber, instead of the published estimate of 25,825,000,000. It may be that the estimated yield is too great, or that the extent of the belt has been overstated; but it is a matter of common experience that estimates fall short of the actual yield of claims when they are "worked," and there are those who believe "the half has not been told." During the past year two Canadian gentlemen went into the forest here, and, after careful estimates, concluded that 350,000 feet per acre would be a fair average. These gentlemen had long been accustomed to such work in the pine forests of Canada; one, I believe, was a government estimator. . . The estimated cut of all descriptions of redwood lumber for the census year 1880, as published in the government statistics for that year, was 186,000,000 feet, including shingles, shakes, and the various productions of the mills. According to statements published in the local papers here during that year, about one-half that amount was manufactured by the mills on Humboldt Bay, exclusive of shingles and other small work. For the year ending May, 1884, the cut of these mills will probably be twenty-five per cent greater, by reason of the increased demand, the additional capital invested, and the improved methods of logging and lumber-making which are constantly being adopted. . .

An observant person soon discovers that nearly all the lumber piled upon the docks — in fact nearly all that is made — is what is known to the trade as "clear" lumber, — that is, without knots or defects of any kind; and upon inquiry he will find that about seventy per cent of manufactured redwood is of this description; whereas not more than twenty or twenty-five per cent of eastern lumber is clear, the other seventy-five or eighty per cent being merchantable or refuse — that is to say, of second and third grades, as understood by lumber dealers the world over. Here is one great advantage of the redwood over other lumber-producing woods. The trees grow almost without limbs, and, as a result, make clear lumber. Much of this beautiful clear stuff we have seen on the wharf is rough (undressed), and is destined for foreign markets — Australia, Sandwich Islands and South American and Mexican ports. A few cargoes have gone to Europe also; but Europe has not yet seen enough of the redwood to become acquainted with its real merits, and it may be said that no market exists there. However, a number of Scotch capitalists, together with some of our enterprising lumbermen, have just now united to operate in this direction, and it is safe to infer that the markets of northern Europe will soon be opened. These gentlemen have secured about 75,000 acres of the choicest timber in the whole belt — that portion lying in Humboldt County, and tributary to Humboldt Bay. This is the land estimated by the government to contain 200,000 feet per acre — or rather, their land lies within this tract. They have, besides, purchased nearly all the mill property on Humboldt bay, and all of that at Trinidad, together with vessels, privileges, etc. — one of the largest business transactions, by the way, which has been consummated in California for many a year, and which gives to the purchasers the best of opportunities for extending the redwood traffic in all directions. They have, under the modest title of The California Redwood Company, established themselves at San Francisco, from which central point they can reach the four corners of the earth with the greatest facility. With millions of capital, an abundance of brain-force, and an unlimited supply of material to work with, it will be strange if this most excellent of all building materials, redwood lumber, does not soon acquire that universal popularity to which it is justly entitled. . .

Redwood is used quite extensively as a veneer. The best part of the tree for this purpose is that at the base — just where the trunk joins the root. For years it was the custom in felling timber here to leave a stump of ten or twelve feet; it is still done in many cases. I cannot explain why — I only know it is so. But this stump, so long ignored, is, for many reasons, the best part of the tree; it is more compact and solid, is darker in color and more durable — it is, in fact, indestructible, as it will neither burn nor decay — a fact fully appreciated by those who have attempted to clear off redwood land for tillage. Among these stumps of the old worked-out logging claims there is a rich harvest for future reaping. From them can be obtained the very best of material for veneering, while many, perhaps a large proportion of them, are well worth working for the choice lumber they contain. This harvest will not be reaped to-day; the greater harvest of the forest demands the energy and enterprise of man. But the future will take care of it — it will not go to waste. Much of the timber which is now neglected — the smaller growth of two to three feet diameter — will be utilized, and some pains may be taken to preserve and protect the younger growth of the forest. This is problematical, however, as the history of all lumber-producing forests has been the same — they are made to yield to present needs, regardless of the future.

"The continual timber-supply capacity of a redwood forest under judicious care is so prodigious," says "*Forest Trees of California*," "as to be simply incalculable; none but a suicidal and utterly abandoned infanticidal policy, wantonly and untiringly practised, can ever blot them out." And one would think, from the nature of these forests, the conditions under which they grow and attain such proportions and such extreme age, that their existence might be prolonged indefinitely. But it is just this "abandoned policy," at work in the redwoods, which has sealed their doom. An effort was made some years since to induce the government to make two or more reserves in the heaviest-timbered portion of the belt; but the effort failed, and the whole forest has either passed into private hands or is open to pre-emption and destruction. Not only is every available appliance used for getting out timber in the quickest and easiest manner, but the brand is frequently applied for the purpose of clearing away the rubbish and dense tangled undergrowth which would render logging well nigh impossible. While these brush fires do not affect the timber (for it is practically fire-proof), they must retard the growth of the seedlings and injure, if not kill outright, the tender shoots just putting up from the ground. Little or no effort is made to preserve the trees too small for present use — trees of one, two or three feet diameter. If they stand in the way, clear them out; if they happen to be crushed under a fallen tree, no matter — there are enough and to spare for present needs. Why should they not make way for man's insatiate lust for gold?

And so I ask, How long will the redwoods last? A few years at most. But in that brief time men will build their castles and their thrones of power upon the ruins of this mighty race of giants, with the one regret that there are no more to conquer!

A WICKERWORK SCAFFOLD.

THE following letter, by Mr. H. Hems, appeared recently in the *Herts Advertiser*: — Under this heading, in your current issue, is a paragraph referring to an odd scaffolding of wickerwork, with which, towards the end of the last century, one Birch, a basket-maker, of St. Albans, covered the graceful spire of St. Mary's Church, Islington. I happen to possess in my collection an engraving of this quaint and rare example of architectural construction. The spire is shown covered entirely by basket-work, looking very like a monster strawberry-pottle, or one of those cruel cages of the same material into which, says tradition, our Druidical forefathers used to pile unfortunate victims prior to burning. The basket began on the top of the tower — *i. e.*, 87 feet from the ground — and went up right beyond the apex of the steeple, which in itself stands 164 feet. This is no small altitude, being 20 feet or so higher than St. Alban's Abbey tower. A few more particulars relative to the work of this enterprising basket-worker of Verulam may possibly be interesting to your readers; so here they are, as from Nelson's third "Islington" (A.D. 1829):— "In 1789 a flagstaff, 42 feet high, which stood at the southwest corner of the tower, was removed, and an iron conductor was affixed to the spire, to preserve the building from the effects of lightning. The means used to effect these alterations were at once novel and ingenious. Thomas Birch, a basket-maker, undertook, for the sum of £20, to erect a scaffold of wickerwork round the spire, and which he formed entirely of willow, hazel, and other sticks. It had a flight of stairs within, ascending in a spiral line from the balustrade of the tower to the vane, by which the ascent was as easy and safe as the stairs of any dwelling-house. This ingenious convenience superseded the use of a scaffold, and was found to be of less expense. The spire on this occasion presented a very curious appearance, being enveloped, as it were, in a high basket, within which the workmen were performing their operations in perfect safety. The emolument received by the basket-maker on this occasion was very considerable, from the donations not only of the inhabitants, but of others, whose curiosity daily led them from London and the adjacent villages to view this surprising piece of workmanship. The exhibition was advertised in the newspapers, and the price of admission to the wicker staircase was sixpence each person. It is stated in Mr. Biggerstaff's MS. that Birch collected upwards of £50 by this exhibition. The late Alderman Sir William Staines is said to have been the first person who contrived this kind of scaffolding when repairing the spire of St. Bride's Church in London, which was damaged by lightning in the year 1764. It was afterwards improved upon by Birch in repairing the steeple at St. Albans, and he brought it to the greatest perfection in Islington on the occasion above mentioned. A print of the church, with the spire enveloped in the wickerwork, about seven inches square, was engraved and published in February, 1788, by Matthew Skinner, of Camden street, Islington, who was a skilful architect, much attached to archæological inquiries. There is also a copperplate engraving from this drawing by J. Roffe, and the Rev. John Swertner, a

Moravian minister, published a panoramic view in aquatint taken from the tower at the time of the wickerwork." Whilst on the topic of St. Mary's Church, Islington, those who are interested in bells may like to know the inscriptions upon seven out of the eight of them. They run as follows: —

1. — Altho' I am but light and small,
I will be heard above you all.
2. — At proper times our voices we will raise,
In sounding to our Benefactor's praise.
3. — If you have a judicious ear,
You'll own our voices sweet and dear.
4. — To honor both our God and King,
Our concert shall in concert ring.
5. — Whilst thus we join in cheerful sound,
May love and loyalty abound.
6. — In wedlock's bands all ye who join,
With hand your heart unite,
So shall our tuneful tongues combine
To laud the nuptial rite.
7. — Ye ringers all, that prize your health and happiness,
Be sober, merry, wise, and you 'll the same possess.

SOUND-PROOF CONSTRUCTION.

THE qualities which contribute towards making a fire-proof building are usually those which are best to prevent the passage of sound. A hollow floor of wood, for instance, is a very combustible as well as sound-making structure. If we ceil it, we make it impervious to both to a certain degree; hence the value of plastering of some thickness if it can be executed without risk of cracking. For lodging-houses the absolute importance of both fire-proof and sound-proof floors and partitions need hardly be asserted, though it is unfortunate to admit that the class of property, which is let in this way is the worst built and the most vulnerable, both as to the passage of fire and sound. Fire-proof floors are necessarily costly unless constructed in the way we lately pointed out, namely the complete immersion of iron-bars of small section in concrete, the bars forming a kind of netting for the latter, which is laid upon a centring of boards at the ceiling level. It is not so generally known that solid-wood floors have strong recommendations in their favor; they are comparatively fire-resisting, and quite sound-proof. In this form of flooring the joists are placed close together, the floor-boards are tongued, and the ceiling filleted, lathed, and plastered in the usual manner. Or the joists are in some cases brought into close contact by spikes at intervals, or by screw-bolts. The spikes or screw-bolts are placed eighteen inches apart, and fixed alternately. Angular grooves run along the bottom edges of each joist, forming, when they are put together, a series of dove-tail grooves, which provide a key to the plaster ceiling. Specimens of these floors may be seen at the Health Exhibition (Messrs. Evans & Swain's exhibit). Staircases are made in the same manner; the joists are of course cut to the triangular section of the steps, and are in contact. These are spiked or screwed together, and as each joist is cut square at the bottom and grooved, a good key is given to the plaster. This firm make a solid wood staircase at about 3*s.* 6*d.* per foot lineal of step. They are fixed into walls in the same manner as stone staircases. For laborers' dwellings and hospitals, a solid wood floor would combine all the necessary qualities of health and safety. There being no hollow spaces between the joists, into which all kinds of dust and filth often fall, one of the fruitful causes of infection would be removed. The occupants in lower rooms would not be disturbed by noisy tenants over them; while, if an infectious disease breaks out in one of the lower apartments, it would not be carried so easily to the dwellers above. Fire also would be arrested materially in its progress upwards, if not entirely subdued by the solid floor. Here we have, therefore, (1) greater cleanliness; (2) freedom from noise; (3) less risk of infection spreading; (4) less risk of fire — four direct advantages of the solid floor, which we do not obtain in the ordinary hollow construction.

But architects have another and, in some cases, simpler method of rendering floors and partitions fire and sound-proof. The application of silicate-cotton or slag-wool is less general than its merits deserve. Silicate-cotton is a pure mineral fibre manufactured from the slag of blast-furnaces, and it can be made into sheets or packed into the spaces between the timbers, thus deadening sound, and rendering floors and partitions fire and sound proof. Asbestos felt is also prepared for the purpose of fire-proofing, and in checking the conduction of heat and cold. The felt can be laid between the flooring boards or studs, or on the ceiling or walls before they are plastered. Bell's asbestos-flooring and wall-felt is manufactured for these purposes.

Of still more recent modes of deadening sound we may mention the use of reeds for ceilings instead of laths. The reeds are secured to strong wires in the shape of webbing, which is fixed to the under-side of the joists. The reeds are close, or nearly so, just sufficient space between them being allowed to form a key for the plaster. The plaster is then put on in the usual coats. These ceilings are said not to crack as in the case of shrinkage of laths; they are easily and rapidly fixed, and are recommended for floors subject to vibration. Then we have felt and the excellent "Willesden" paper, both admirable layers for floors and partitions serving to deaden sound, and both non-conductors of heat and cold. We have here touched upon methods and materials which serve to arrest the passage of sound; but there are other modes of accomplishing the purpose by the judicious laying of timbers, their embedding in the walls, and the prepation of mortar with non-conducting substances like slag-wool or saw-dust. — *Building News.*

THE EFFECTS OF FROST ON BUILDING-STONE.

FROM THE FOUNTAIN GROUP IN BRONZE BY AUGUST SOMMER.

THE study of the above question has led to many detailed investigations, without precise and definite results having been arrived at. The only indications of any exactness are those which have proceeded from lengthened observations of materials employed in climates and under circumstances analogous with those for which it is proposed to draw inferences from practical experience.

In bringing forward, in the *Revue Industrielle*, some connected details upon various branches of this subject, M. Braun remarks that nothing definite is proved by the statements made at a certain period respecting sulphate of soda. It has often happened that stones which have resisted expansive force have later on given way under the influence of frost, while the contrary has sometimes been remarked. It must not, however, be concluded if stone has for a length of time resisted the effects of frost, that it will do so for an indefinite period. The case of the stone bridge at Borrege, cited by Vicat, is a striking proof bearing on this point.

After calling attention to the fact that the effects of frost are often confounded with other causes of deterioration to which stone is liable, M. Braun endeavors to define in an exact manner the question under discussion, asserting that a stone is affected by frost when its resistance to longitudinal traction is less than the force of expansion of the water contained in its pores at the moment of its transformation into ice.

The *Journal du Céramiste et du Chaufournier* remarks that this theory requires certain modifications in practice. It is, however, admitted that, supposing this definition to be exact, it furnishes a provisional solution of the problem, and would allow of the resistance of a stone to frost being ascertained without exposing it to a practical test. According to mechanical theories, a kilogramme ($2\frac{1}{5}$ pounds) of water in freezing develops an amount of mechanical labor equalling 33.681 kilogramme-metres (243.51 foot-pounds). This knowledge of the force developed by water at the moment of its changing its condition would enable the resistance of a stone to frost to be estimated if there were also known: 1, its density; 2, its porosity; 3, its resistance to longitudinal traction. Thus, if the quantity of water contained in a cubic centimetre (.061 cubic inch) of a stone does not produce in congealing a force superior to its resistance to traction per square centimetre (.15 square inch), the stone would not be affected.

Unfortunately, however, matters are not so simple in practice. The principal elements of perturbation are (1) the want of homogeneousness in stones; (2) the state of superfusion of water, which is often produced in the interior of stones; (3) the chemical action of the waters of the quarry. The first point is too well known to call for detailed reference. The capacity for absorption of water which is possessed by stones from the same quarry (or even from the same part of it) varies to such an extent as to render it difficult to fix *à priori* what is the quantity of water the expansive force of which in congelation has to be estimated.

The circumstances under which the longitudinal traction takes place must not be lost sight of. M. Braun, relying upon Hodgkinson's experiments, considers that the figures arrived at in the tests of traction should be reduced by one-third. As the complete rupture is always preceded by a disaggregation which is indicated by fissures, and as these fissures are generally produced under a burden which varies between one-third and one-half of that necessary for the total rupture, it would be necessary, in view of these facts, to introduce a new co-efficient of reduction, comprised within the limits indicated. This *co-efficient of broken equilibrium*, as M. Braun designates it, must be always attended by uncertainty in its determination, according to the opinion expressed by the journal already mentioned. As a summary of his investigations, M. Braun gives this formula: —

$$(C + C_1)\ R \gtreqless 33.681\ A.$$

C = The co-efficient of reduction as deduced from Hodgkinson's experiments.
C_1 = The co-efficient of broken equilibrium.
R = The average burden per square centimetre, which determines the rupture under the action of longitudinal traction.
A = The quantity of water contained in a cubic centimetre of stone and expressed in grammes.

When the first number of the above is superior to the second, the stone is fit for building purposes. When the contrary is the case, the stone should only be used in situations where it is not exposed to frost.

It is admitted, in conclusion, that M. Braun's ideas are both new and original, displaying, at the same time, such an amount of probability as to render it possible for them to mark a new point of departure in experiments bearing upon the subject under discussion, notwithstanding the speculative nature of some of the principles enunciated. — *The Builder.*

ONE FORM OF TRUSSED JOIST.

Los Angeles, Cal., June 14, 1884.

To the Editors of the American Architect: —

Dear Sirs,—There is an idea current among builders, that nailing strips to the sides of joists of, say, 1″ x 4″, or 1″ x 6″, in truss form, making the bottom fibres of joist serve as tie-rod, strengthens the joist. Please let us know, to settle the question, if it does answer that purpose more than merely giving strength by keeping joists from splitting. Constant Readers.

[Trussing of this kind stiffens the beam very slightly, probably less than the same amount of material would if added to the thickness of the beam. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Uncertain Success of Artesian-Well Boring. — The experience of the Winchester Arms Company, of New Haven, Conn., in the matter of artesian-well boring is somewhat peculiar, and from present accounts seems of a sufficiently discouraging nature to make farther prosecution of the work doubtful. The company use a large quantity of water daily, and, in order to effect a saving in water bills, commenced sinking an artesian well on their premises some two years ago. All the necessary preparations were made, and the work of putting down a 6-inch hole was begun by a contractor of long experience in the Pennsylvania oil regions. In a month the hole reached a depth at which ordinarily plenty of water is found, but in this case the bore remained perfectly dry. A fresh contract was made, and then another and another, but still no water was reached. At length sandstone was struck, and this made progress more than ever slow. Up to the present time the total cost of the operations is estimated at $18,500, and the company now find themselves with a hole within a few feet of half a mile deep on their hands, with no water in it. To make matters still worse, it is found that a chunk of iron has fallen to the bottom of the shaft, thus effectually crippling the work of the drill. It is thought that it will take about three months to bore through it, and the contractor is now in search of suitable apparatus with which to fish out the obstruction. If it fails, the well will probably be given up. — *The Metal Worker.*

Taking down a Chimney. — From a paper entitled "Chimney Construction," by Messrs. R. M. and J. F. Bancroft, we take the following interesting account of an ingenious arrangement employed for taking down a chimney-shaft in Middlesboro', England, the method followed being necessary, as the chimney stood in a crowded position, and therefore could not be thrown down. The bricks had to be lowered with as little damage as possible, so that they might be used again for building purposes. Owing to the position of the chimney the bricks could not be thrown down outside, and if thrown down inside they would have been smashed, or if lowered by mechanical means the process would have been very tedious, and was impracticable. Under these circumstances it was considered whether the bricks could not be allowed to fall by their own gravity, and at the same time be cushioned sufficiently to break their fall and prevent damage. In order to do this an air-tight iron box was placed at the bottom of the chimney: this box was fitted with an air-tight door mounted on hinges, and closing on an India-rubber face, against which it was tightened by a wedge. A wooden spout was then fixed to the top of the box and carried up the chimney; it was 3½″ x 5″ inside, and was made of planks 1¼″ thick, well nailed together, with a little white lead on the edges, thus making it air-tight. The spout was made in about twelve-foot lengths, and these were joined together by cast-iron sockets or shoes, and corked round with tarred yarn, the whole apparatus costing about $30. A few stays were put inside the chimney to keep the spout steady, and steps were nailed upon it, by which the men ascended. It will be seen that the whole of the spouting being air-tight, if a brick filled the spout it would not descend; but as the section of a brick is 3″ x 4½″, and the spout was 3½″ x 5″, there was a quarter-inch space each way through which the air could pass the brick freely, the space further allowing for any irregularity in the sizes of the bricks. The result was that the bricks, being cushioned in their fall, arrived at the bottom without any damage. As soon as the box was full the man at the bottom rapped on the spout as a signal to stop, and then opened the air-tight door and removed the bricks inside. This being done he shut the door and signalled same to the man at the top. The man on the top lowered his own scaffold, and as the spout became too high he cut a piece off with a saw. If there was much mortar adhering to the bricks it was knocked off before putting the latter into the spout, and such mortar, etc., was allowed to fall inside the chimney, and was afterwards wheeled out.

Subterranean Water Supplies. — Some information of considerable interest has reached us from Adelaide with reference to the sinking of a very effective artesian-well in the far north of the extensive colony of South Australia. The well has been sunk at Tarkanina, sixty miles north of Farina, and good water was struck at a depth of 1220 feet. The water gushed up 20 feet above the surface. The investigation which led to this important discovery was commenced under the Surveyor-General of South Australia in 1881, that official having formed a favorable impression as to the probability of striking fresh water below the salt water known to exist. The first 800 feet was bored with hand tools, but in the course of last year steam-power was substituted, and progress was then made at the rate of 2 feet per day. The bore is the deepest in the Australian colonies, and the discovery is the more important as it is in the cretaceous formation which occupies a large extent of the northeastern corner of South Australia. The eastern part of the formation was accurately determined by the South Australian Government geologist, who reported generally as to the probability of striking artesian water; and the portion at the west of Peake and around the head of Lake Torrens was traced by the Conservator of Water, who was confident of the rich discovery to be made. The extent of the cretaceous formation has been ascertained to be fully 126,000 square miles. It is interesting to note that the South Australian Government geologist, in reporting upon the country in the course of last year, expressed his belief in the existence of a plentiful supply of artesian water in the neighborhood. Referring to the evidences of extinct springs, he observed; "Between Mulligan and Blanchewater, at several points, in groups rising in small, roughly dome-shaped masses above the surface of the soft clay of the plains, are semi-concentric masses of iron ore (hematite), which are doubtless the remains of old spring deposits. In the same neighborhood similar-shaped circular protuberances of limestone come to the surface, which I take to be also the old outlets of extinct calcareous springs. The surface of the ground over a large extent of country here is covered with pieces of gravel of iron ore, in addition to nugget-like pieces of porcelainized rock, from which circumstance the water-course flowing through it is called Dreary Creek. In the sections shown in some of the creek banks bands of ferruginous clay-stone and iron-stone are found, as well as ferruginous conglomerate. As previously shown, water is rather plentiful in the older rock formations, although it cannot be determined before sinking whether it will be brackish or fresh. The numerous beds of limestone which are interstratified with the other rocks are favorable to the storage of water in caves, and hollows, and underground streams. The occurrence of calcareous conglomerate and tufa on the surface of the older rocks, and in gullies and creeks traversing them, points to the eruption of water charged with lime at some not very remote period. The Flinders and other ranges lying to the south of the plain and sandhill country act as a dam to prevent the subterranean water from reaching the sea; this gives rise to the natural artesian springs such as Mulligan, Blanchewater, etc. The actual artesian wells show that in those localities water will rise to the surface when the water-bearing strata have been pierced. Whether it will do so all over the area above mentioned depends on the level of the land, the depth of the formation, the undulations of the bed rock, etc. It is, however, certain enough that water will be found in sufficient quantities by sinking to a moderate depth."— *Engineering.*

Fate of the Hotel de Chimay. — The Hôtel de Chimay is soon to pass away as a residential palatial dwelling, its acquisition having been found indispensable for the enlargement of the School of Fine Arts. The Budget Committee, it is expected, will vote the credit of nearly £4,250,000 required for the purchase. The property at present of a Belgian noble, the Hôtel de Chimay, is one of the most celebrated residences in Paris, having been occupied successively by historical characters, including Princes of the blood, financiers, noblemen, etc. It was built by Mansard, Lebrun embellishing the ceilings, and at one time served to shelter Henrietta of France, widow of Charles I. Marianne Mancini, the youngest niece of the great Cardinal Mazarin, made it the rendezvous of the shining lights of the art and literature of her period; La Fontaine, Chaulieu, Le Fare and Pradon being her habitual guests. In 1822 the hôtel, or rather the two buildings at Nos. 15 and 17, on the Quai Malaquais were sold as national property, Pellapra, the financier, being the purchaser. The property passed through his daughter into the family of the Caraman-Chimays, with which the Montesquiou-Fezensac and de Greffulhe families are connected. The Hôtel de Chimay proper consists of the main building and two wings, the left of these being occupied by Dr. Charcot and M. E. Pailleron; the right by the widow of M. Buloz. The gardens, which separate it from the Fine-Art School, were the scene of sundry summary shootings by the Communists in 1871; one of the pillars of the arcade still bears the marks of blood. Prince Caraman, who occupies the ground-floor is entitled, according to his sale agreement, to dispose of the magnificent chimney-pieces which adorn the rooms. — *Galignani's Messenger.*

A Breach in the Wall-Paper Ring. — The members of the American Wall-Paper Association have held together with remarkable unanimity and success until recently one of the large concerns, finding their mill too small for their trade tore it down and rebuilt. By the rules of the association they claimed and got $70,000 as their share of the season's profits in the Association, although they had not run a day. This caused dissatisfaction and kicking, and they left the pool, with one or two other manufacturies. This has been a big monopoly, holding the prices way up, and enabling them to divide handsome profits. But a few have left the fold, and the remaining ones claim that they will not go to pieces, and that they can meet the competition and still maintain prices — *Southern Trade Gazette.*

The Zinc Mines of Kansas. — The largest zinc producing locality in the world is the district around Galena, Kansas. Last year 70,000 tons were mined.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

302,232. FIRE-ESCAPE. — Charles Bloss, Bethlehem, Conn.

302,236. SASH-FASTENER. — David Hector Butler, Cane Valley, Ky.

302,240. SCAFFOLDING. — John L. Clevenger, Dayton, O.

302,247. ELLIPSOGRAPH.—John Harwood, Oshkosh, Wis.

302,253. APPARATUS FOR THE PREVENTION OF ESCAPE OF GASES FROM PIPES OF WASH-BASINS, ETC. — Paul Hoffman, New York, N. Y.

302,369. SINK-PIPE CAP. — Cornelius J. Lyons, Hartford, Conn.

302,278. FIRE-ESCAPE. — Cornelius J. O'Sullivan and Eugene J. O'Sullivan, Chicago, Ill.

302,286. CORRUGATED-IRON ROOFING. — L. Lewis Sagendorph, Cincinnati, O.

302,289. MANUFACTURE OF BOICKS MADE OF GLASS. — Francis H. Shaw, Newark, N. J.

302 308. SCREW-DRIVER. — Jotham S. Works, Abbot, Me.

302,318. SEWER-PIPE AND TRAP. — Joseph Brungard, St. Louis, Mo.

302,320. RATCHET-BRACE. — John Chantrell, Bridgeport, Conn.

302,325. ELEVATOR. — Henry M. and Robert F. Darling, Linwood, O.

302,334. BIDET. — James Hanse, Brooklyn, N. Y.

302,338. CONSTRUCTION OF BUILDINGS. — Peter H. Jackson, San Francisco, Cal.

302,339. STAIRS FOR BUILDINGS.— Peter H. Jackson, San Francisco, Cal.

302,343. PIPE-JOINT AND COUPLING. — John C. Kitton, San Francisco, Cal.

302,346. CLAMP.—William H. McAuley, New York, N. Y.

302,348. DEVICE FOR OPERATING DOORS AND GATES OF ELEVATOR-HATCHWAYS. — Thomas H. Melrose, San Francisco, Cal.

302,351. PORTABLE WATER-CLOSET. — Charles C. Nash, Providence, R. I.

302,353. CISTERN AND TANK CLEANER. — John E. Pattison, New Orleans, La.

302,358. EAVES-TROUGH HANGER. — Daniel B. Rock, Fairfield, Pa.

302,373. VENTILATING AND ADJUSTABLE RAIN-PROOF. — Samuel T. Atkin, Georgetown, Tex.

302,383. BRICK-MACHINE. — Charles A. Carpenter and Joseph Hill, Keokuk, Iowa.

302,384. SLIDING-DOOR LOCK.— James B. Cook, Yarmouth, Mass.

302,397. DOOR-LATCH. — James R. Gray, Ayer, Mass.

302,404. PROTECTOR FOR CHIMNEYS. — Henry W. Holly, Brooklyn, N. Y.

302,413. KILN FOR BURNING BRICKS, ETC.—Henry Knowles, Woodville, County of Leicester, England.

302,416. FLOOR-JACK.—Emmett J. Lobdell, Northville, N. Y.

302,429. ROOF-FENDER.—Frederick O. Rogers, Boston, Mass.

302,443. PROCESS OF ABSORBING HEAT FROM ROOFS OR MATERIAL BY USE OF A LIQUEFIED GAS. —Julius J. Suckert, Ridgewood, N. J.

302,459. FIRE-ESCAPE. — Charles Wood, Worcester, Mass.

302,463. TORNADO-PROOF BUILDING. — Francis K. Alexander, Sterling, Ill.

302,476. VENTILATING VAULT-COVER. — Chas. E. Furman, New York, N. Y.

302,489. RADIATOR FOR HOT-AIR FURNACES AND STOVES. — Cyrus S. Hood, Corning, N. Y.

302,490. ELEVATOR. — George C. Howard, Philadelphia, Pa.

302,530. REFRIGERATOR-BUILDING. — Chas. Vogel, Rochester, N. Y.

302,531. CHIMNEY-TOP OR COWL. — Jean Wüstner, Annecy, France.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report twenty-nine permits have been granted, the more important of which are the following:—

Robert Garrett, three-st'y brick building, Monument St., between Charles and Cathedral Sts.

John Hochschild, three-st'y brick building, e s Gay St., between Aisquith and Forrest Sts.

Bernard Link, 4 two-st'y brick buildings, e s Chapel St., s of Gough St.

Lawrence Turnbull, 36 two-st'y brick buildings, n and s s Pinckney St., between Greenmount Ave. and Carter Alley.

Hy. Bergman, 5 two-st'y brick buildings, w s Bradford Alley, s of Monument St.

Jas. H. Gable, 4 three-st'y brick buildings (square), s s Tennant St., between Woodyear Alley and Carey St.

Conrad Ripple, 2 three-st'y brick buildings, e s Hanover St., between Fort Ave. and Clement St.

C. C. Fink, three-st'y brick building, e s Broadway, s of Chew St.

Seth A. Marchant, 8 two-st'y brick buildings, n s Jefferson St.; and 18 two-st'y brick buildings, w s Chester St., between Jefferson and McElderry Sts.

E. W. Haviland, 26 two-st'y brick buildings, e s Hanover St., between Winder and McComas Sts.

Geo. F. Seward, three-st'y brick building, e s Williams St., between Warren and Montgomery Sts.

The Labor Quotations remain unchanged.

Brooklyn.

BUILDING PERMITS. — *Nelson St.*, s s, 240′ e Clinton St., 2 three-st'y brick tenements, tin roofs, wooden cornices; cost for both, $9,000; owner, etc., Thos. Keogh, 149½ Nelson St.

Broadway, e s, 65′ s Flushing Ave., three-st'y brick store and dwell., tin roof; cost, $6,500; owner, Louisa Herle, Fifth Ave., cor. Fifteenth Sts.; architect, John Platte; builders, John Auer and F. Herte.

Broadway, e s, 37′ s Flushing Ave., three-st'y brick store and tenements, tin roofs; cost, $8,000; owner, architect and builders, same as last.

Broadway, s e cor. Flushing Ave., three-st'y stores and dwell., tin roof; cost, $8,500; owner, architect and builder, same as last.

Sullivan St., s w cor. Conover St., four-st'y brick store and tenements, tin roof; cost, $7,750; owner, Charles Plate, 149 Conover St.; architect and builder, C. M. Detlefsen.

Conover St., w s, 22′ s Sullivan St., 3 four-st'y brick stores and tenements, tin roofs, wooden cornices; cost for all, $22,000; owners, Platte & Co., 149 Conover St.; architect and builder, C. M. Detlefsen.

Hancock St., n s, 160′ w Nostrand Ave., 4 three-st'y brown-stone dwells., tin roofs, wooden cornices; cost, each, $6,000; owner and builder, S. E. C Russell, Brooklyn; architect, I. D. Reynolds.

Flatbush Ave., s w cor. Pacific St., 2 two-st'y brick stores and dwells., gravel roofs; cost for both, $10,500; owner, Abraham Knox, Sixth Ave., cor. Lincoln Pl.; architect, M. J. Morrill; builders, J. M. Brown and Wm. V. Williamson.

Lorimer St., w s, 20′ n Calyer St., 6 two-st'y brick dwells., gravel roofs; owners, D. A. Manson, et al.; architect, G. H. Gerard; builder, J. B. Woodruff.

Stockton St., n w cor. Lewis Ave., three-st'y frame store and tenement, tin roof; cost, $5,000; owner, T. J. Moore, 72 Sumner Ave.; architect and builder, John Erickson.

Graham St., w s, 170′ s De Kalb Ave., three-st'y brick picture-frame factory, gravel roof; cost, about $7,500; owner, Hugo Tolliner, 421 Franklin Ave.; architect, A. Hill; builders, Chas. Collins and T. Doris.

Leonard St., e s, 120′ s Norman Ave., one-st'y frame church, tin roof; cost, $5,000; owner, Reformed Episcopal Society, Leonard St.; architects and carpenters, Randall & Miller; mason, Israel Reed.

Ross St., No. 31, n s, about 87′ from Kent Ave., three-st'y dwell. and stable, gravel roof, brick cornice; cost, $3,500, owner, Mrs. A. S. Scholes, 145 Bedford Ave.; architect and carpenter, Wm. Seaman; mason, Henry McQuilkin.

Grand Ave., e s, 74′ 7′ s Lexington Ave., two-and-one-half-st'y brick dwell., tin roof, wooden cornice; cost, $3,000; owner and builder, Joseph I. Kirby, 73 Gates Ave.; architect, Amzi Hill.

Bartlett St., s s, 200′ w Throop Ave., three-st'y frame tenement, tin roof; cost, $4,300; owner, M. Gunkel, 51 Bartlett St.; architect, H. Vollweiler; builders, Henry Eich & Bro.

Degraw St., s s, 32′ w Smith St., four-st'y brick store and tenement, tin roof, wooden cornice; cost, $5,000; owner and carpenter, John Collins, Degraw St., cor. Smith St.; architect, R. Dixon; mason, J. H. O'Rourke.

Keap St., s s, 188′ e Marcy Ave., 2 three-st'y dwells. and one-st'y extensions, tin roofs, wooden cornices; cost, each, $5,500; owner and builder, Thomas B. Saddington, 246 Keap St.

George St., s s, 100′ e Central Ave., three-st'y frame tenement, tin roof; cost, $4,500; owner and architect, Adolph Pfaudler, Troutman St.; builders, C. Wahler and J. Rueger.

Scholes St., No. 201, n s, 100′ e Humboldt St., four-st'y frame tenement, tin roof; owner, V. Beitsch, on premises; architect, Th. Engelhardt; builder, Chas. Wisbauer.

Myrtle Ave., Nos. 1126 *and* 1128, s s, 52′ w Broadway, 2 four-st'y brick stores and tenements, tin roofs; cost, each, $9,000; owner, A. Vigelius, 845 Broadway; architect, Th. Engelhardt; builders, Jacob Rauth and Jos. Fussi.

Richards St., n w cor. Sullivan St., two-st'y church and lecture-room, slate and tin roof; owner, Trustees of St. Paul's M. E. Church, on premises; architect, John Welch; builders, Algie & Son.

Sullivan St., w s, 90′ n Richards St., three-st'y stone and brick parsonage, slate and tin roof, brick cornice; owner, architect and builder, same as last.

Lafayette Ave., s s, 40′ e Lewis Ave., two-st'y brown-stone dwell., tin roof; cost, $5,500; owner and builder, M. J. McLaughlin, 100 Kosciusko St.; architect, F. D. Van Pelt.

Willow St., n w cor. Pineapple St., 3 three-st'y brown-stone dwells., tin roofs; cost, each, $8,000; owner, C. A. Silver, 20 Sidney Pl.; architect, C. Werner; builders, J. J. Bentjen and F. D. Norris.

Norman Ave., n e cor. Newell St., 2 three-st'y frame stores and tenements, tin roofs; cost for both, $9,000; owner, J. G. Koster, cor. Norman and Oakland Ave.; architect, Th. Engelhardt; builder, I. D. Reed.

Nelson St., No. 62, s s, 167′ e Hicks St., three-st'y brick tenement, tin roof, wooden cornice; cost, $4,500; owner, Dennis Wheeler, on premises; architect, J. F. Nelson.

Lafayette Ave., s s, 20′ e Lewis Ave., three-st'y brick store and flat, tin roof; cost, $6,500; owner and mason, M. J. McLaughlin, 100 Kosciusko St.; architect and carpenter, F. D. Van Pelt.

Nostrand Ave., w s, 75′ n Clifton Pl., three-st'y brick store and dwell., tin roof; cost, $4,500; owner and architect, Henry Van Stader, Nostrand Ave., cor. Clifton Pl.; masons, Van Pelt & Pearce; carpenters, Williams Bros.

ALTERATIONS. — *Sidney Pl.*, e s, 25′ s Livingston St., two-st'y brick extension, tin roof; cost, $6,100; owner, St. Charles Church, Sidney Pl.; architects and carpenters, M. Freeman's Sons.

Johnson Ave., n s, 100′ e Bushwick Ave.; raise one st'y, also one st'y frame extension; cost, $3,000; owner, Peter Frank, Ewen St., near Scholes St.; architect, J. Platte; builders, J. Rauth and Jos. Fresse.

Maujer St., Nos. 34 *and* 36, old brewery altered to theatre; cost, $10,000; owner, C. S. Gray, De Kalb Ave., cor. Fort Greene Pl.; architect, H. Kreitler.

Chicago.

SCHOOL-HOUSES. — The Board of Education is now building five first-class school-houses, the largest of which is the Haven, on Wabash Ave., four stories, 82′ x 138′; J. J. Flanders, architect. It is of Indiana pressed brick, with terra-cotta trimmings; cost, about $75,000.

BUILDING PERMITS. — E. Hentchel, three-st'y flats, 166 La Salle St.; cost, $8,500; architect, J. Zittel.

C. H. Briott, three-st'y flats, 113 North Clark St.; cost, $4,000

H. Zoelck, three-st'y flats, 605 West Chicago Ave.; cost, $5,000; architect, D. Westphail.

W. Silhnek, three-st'y flats, 818 South Ashland Ave.; cost, $5,000; architects, Benes & Sayer.

W. Cuthbert, two-st'y dwell., Prairie Ave.; cost $4,500.

W. H. Borcherding, two-st'y dwell., 72 Nineteenth St.; cost, $2,500.

T. W. Christolph, two-st'y flats, 40 Belleview Place; cost, $3,500.

M. Manquette, two-st'y dwell., 222 West Division St; cost, $2,800.

Mrs. E. Bailey, two-st'y dwell., 81 McAllister Place; cost, $6,000.

W. J. Anderson, 7 cottages, 24 to 40 Homer St.; cost, $6,000.

B. Wadden, three-st'y store and dwell., 298 North Market St.; cost, $4,000; architect, Geo. Spear.

M. Dwyer, three-st'y dwell., 325 North Wells St.; cost, $7,000; architect, G. S. Sporh.

U. P. Smith, 6 two-st'y dwells., 3122 to 3144 Cottage Grove Ave.; cost, $30,000.

C. Weber, two-st'y dwells., 2734-6 South Park Ave.; cost, $4,500; architect, Arndt.

Mrs. M. F. Barrett, two-st'y dwell, 323 Burling St.; cost, $8,000; architect, J. Addison.

G. Slafter, two-st'y dwell., 3135 Forest Ave.; cost, $7,000; architect, L. B. Dixon.

G. Plamp, two-st'y dwell., 158 Bissell St.; cost, $2,800.

H. S. Newton, two-st'y dwell., 95 Warren Ave.; cost, $4,000.

J. Hart, four-st'y store and dwell., 136 Townsend St.; cost, $10,000; architect, J. Otter.

E. Luth, St. Jacob School, school-house, 79 Burling St.; cost, $5,000; architect, C. F. Berlin.

N. Manheimer, two-st'y dwell., 546 Hurlbut St.; cost, $4,000.

Mrs. P. Portman, 2 two-st'y dwells., 603-5 West Superior St.; cost, $6,400.

Mrs. R. G. Warner, two-st'y dwell., 503 Dearborn Ave.; cost, $5,500.

J. H. Smith, three-st'y dwell., 42 Lincoln Place; cost, $10,000.

J. G. Shortall, two-st'y dwell., 1608 Prairie Ave.; cost, $12,000.

A. Anderson, two-st'y dwell., 393 West Erie St.; cost, $4,600.

P. Delph, two-st'y dwell., 716 California Ave.; cost, $4,000.

E. Heinze, two-st'y dwell., 151 Osgood St.: cost, $4,000.

J. Hokart, two-st'y dwell., 432 West Huron St.; cost, $3,300.

F. B. Little, two-st'y dwell., 1361 Jackson St., cost, $3,000.

G. W. Adams, two-st'y dwell., 3242 Indiana Ave.; cost, $6,000; architects, Treet & Foltz.

W. H. Thomas, two-st'y dwell., 1343 Jackson St.; cost, $2,500.

N. Fagen, three-st'y store and dwell., Halsted St.; cost, $8,000; architect, P. W. Ruehl.

Geo. Prince, 3 cottages, Erie St.; cost, $3,000.

M. Kleiner, two-st'y dwell., 3525 Vincennes Ave.; cost, $5,000.

D. Buchanan, two-st'y store and dwell., 343 West Twelfth St.; cost, $4,000.

J. Johnson, three-st'y flats, 68 Mohawk St.; cost, $3,000.

J. Conway, two-st'y dwell., 318 Webster Ave.; cost, $5,000; architects, Furst & Rudolph.

G. A. Engelhardt, two-st'y dwell., 13 Emma St.; cost, $3,500; architects, Shaub & Berlin.

Detroit.

BUILDING PERMITS.—The following permits, amounting to $5,000 or more, have been granted since last report:

W. E. Brown, roller-skating rink, East Larned St.; cost, $25,000.

Peter Hedricks, new St. Mary's Church, cor. Crogan and Antoine Sts.; cost, $65,000.

H. H. Humphreys, brick dwell., 38 Henry St.; cost, $6,000.

Hugh McMillan, new stores, 407-9 Woodward Ave.; cost, $5,000.

Thomas Payne, three-st'y brick dwell., 38 Willis Ave.; cost, $6,000.

Mason & Rice, brick dwell., Parsons St.; cost, $6,200.

C. L. Cole, three-st'y brick building, 63 Alexandrine Ave.; cost, $6,000.

W. H. Travis, three-st'y double brick building, 232 Fourth St.; cost, $6,000.

William Myll, three-st'y brick dwell., 83 Macomb St.; cost, $8,000.

William Scott & Co., three-st'y brick dwell., 619 Cass Ave.; cost, $6,000.

M. W. Scovel, three-st'y brick block, 92-94 Grand River Ave.; cost, $6,500.

Nuppenau & Clark, two-st'y brick dwell., 565 Jefferson Ave.; cost, $5,000.

Nuppenau & Clark, three-st'y block of eight dwells. on Second Ave.; cost, $24,000.

Charles Goodnow & Co., two-st'y double brick dwell., 254-256 Fourth St.; cost, $5,000.

George C. Codd, two-st'y brick dwell., 78-80 West Adams Ave.; cost, $5,400.

A. C. Varney, three-st'y brick dwell., 596 Cass Ave.; cost, $8,000.

Three two-st'y brick dwells., 529 to 539 Trumble Ave.; cost, $12,000.

Two-st'y brick dwell., Hendrie St.; cost, $5,200.

Four two-st'y frame dwells., Putnam St.; cost, $5,500.

William Scott & Co., two-st'y brick dwell., Woodward Ave.; cost, $18,000.

Two-st'y brick and slate dwell. and frame barn, Holden St.; cost, $6,500.

S. W. Jackson, two-st'y brick block of six stores, 360 to 374 Grand River Ave.; cost, $19,600.

New York.

STRIKE. — The continuation of the bricklayers' strike has a very depressing influence on the market, and should the men gain their point, it will seriously curtail contemplated improvements.

STORE. — On the s e cor. of Broome and Mulberry Sts., a five-st'y 25'-front store is to be built from designs of Mr. J. B. Snook, for Mr. P. SkeHy.

STABLE. — At No. 416 East Seventy-sixth St., a three-st'y brick stable is to be built by Mr. Hy. Wiessen.

CHURCH. — On the n s of One Hundred and Fifteenth St., 100' w of Pleasant Ave., a brick and stone church, 65' x 100', is to be built for Our Lady of Mt. Carmel Roman Catholic Church, from designs of Mr. L. J. O'Connor.

BUILDING PERMITS.—*One Hundred and Fiftieth St.*, s s, 175' w Courtland Ave., two-st'y frame dwell., gravel roof; cost, $3,000; owner, Agnes Walsh, 245 East One Hundred and Twelfth St.; architect, J. Walsh; builders, P. Sprague and S. Smith.

Eighty-fifth St., n s, 300' n Second Ave., five-st'y brown-stone tenement, tin roof; cost, $15,000; owner, Patrick Keyes, 352 East Seventy-eighth St.; architect, A. B. Ogden.

Second Ave., s e cor. Seventy-first St., 4 five-st'y brown-stone tenements, tin roofs; cost, each, $14,000; owner, F. A. Seitz, 315 East Forty-second St.; architect, F. A. Barus.

First Ave., n e cor. Seventy-second St., five-st'y brown-stone tenement, tin roof; cost, $18,000; owners, Ph. and Wm. Ebling, St. Ann's Ave., One Hundred and Fifty-sixth St.; architects, A. Pfund & Son.

First Ave., e s, 26' 7" n Seventy-second St., five-st'y brown-stone tenement, tin roof; cost, $15,000; owners, etc., same as last.

First Ave., No. 1348, five-st'y brick and stone store and tenement; tin roof; cost, $17,000; owner, Jacob F. Wahrenberger, 130 Greenwich St.; architect, F. W. Klemt.

East One Hundred and Thirty-fourth St., No. 597, 2 three-st'y brown-stone front dwells., tin roofs; cost, each, $3,500; owner, James Maginn, 18 Broadway; architect and builder, Wm. P. Anderson.

East Fifty-first St., Nos. 347 *and* 349, 2 five-st'y brick tenements, tin roofs; cost, each, $18,000; owner, John W. Smith, 1574 Park Ave.; architect, Wm. R. Smith.

One Hundred and Forty-sixth St., s w cor. Railroad Ave., two-st'y brick factory, tin roof; cost, $4,000; owners, Edwards & Co., One Hundred and Forty-fourth St., near McComb's Dam; architect, Wm. J. Merritt.

One Hundred and Sixth St., n s, 125' w Ninth Ave., five-st'y brick flat, tin roof; cost, $15,000; owner, Henry Bornkamp, 306 West One Hundred and Twenty-seventh St.; architects, Maclay & Davies.

Bergen Ave., Nos. 610 *and* 612, two-st'y frame workshop and dwell., tin roof, cost, $3,400; owner, Theodore Von Gerichten, 722 Westchester Ave.; architect, S. Kramer.

Eighty-sixth St., s s, 70' w Fourth Ave., 2 four-st'y stone and brick dwells., tin and slate roofs; cost, $25,000 and $27,000; owner, Thomas Parson, 2 East Eighty-fifth St.; architect, Wm. Baker.

Bleecker St., No. 9, three-st'y brick store, tin roof; cost, $6,000; owner, Mary Wright, Brooklyn; architect, Fred. C. Withers; builder, E. H. Day.

Seventh St., Nos. 223 *and* 225, 2 five-st'y brick tenements, tin roofs; cost, $15,000 each; owner, Fred. Heerlein, 932 Second Ave.; architect, J. Kastner.

Sixty-first St., s s, 81' w Boulevard, 5 five-st'y brown-stone front flats, tin roofs; cost, each, $18,000; owner, Selig Steinhardt, 650 Madison Ave.; architects, A. B. Ogden & Son.

Third Ave., s e cor. One Hundred and Seventh St., 4 five-st'y brown-stone front flats and stores, tin roofs; cost, each, $18,000; owner and builder, Thos. McManus, 709 Lexington Ave.; architect, J. H. Valentine.

Tenth Ave., s w cor. Sixty-seventh St., 3 five-st'y brick tenements and stores, tin roofs; cost, two, each, $18,000, corner, $20,000; owner, Julius Johnson, 101 East One Hundred and Nineteenth St.; architect, J. H. Valentine.

ALTERATIONS. — *Pine St., No.* 5½, iron skylights, iron stairs, hardwood and glass partitions, etc.; cost, about $15,000; owner, Wm. K. Aston, 22 West Fifty-sixth St.; architect and iron, —— McKinney; builders, Fauchere & Co. and Bogert & Bro.

Catharine St., Nos. 1, 3 *and* 5, repair damage by fire; cost, $4,539; owner, James E. Sandford, on premises; builder, Henry Wallace.

East Eighty-second St., No. 151, raise one st'y and build bay-window on rear; cost, $4,000; owner, A. Vanderbeck, on premises; architect, John McIntyre; builder, M. McGinty.

East Fortieth St., No. 119, raise one-st'y; cost, $4,000; owner, Jane B. Eddy, on premises; architect, E. A. Sargent; builders, Wm. Haigh and McDowell & Robinson.

Philadelphia.

THEATRE. — The Bijou Theatre, situated on Eighth St., below Vine, is to undergo alterations, from plans by Wilson Bros. & Co., architects; also, two dwells. adjoining.

BUILDING PERMITS. — *N. Twenty-fifth St., No.* 1512, two-st'y dwells., 15' x 50'; Frank Gilbert, contractor.

Market St., Nos. 1730 *and* 1732, 2 two-st'y stores and dwells., 14' x 84' 6"; C. L. Grubb, contractor.

Delhi St., n of Susquehanna Ave., 2 two-st'y dwells., 16' x 45'; B. F. Bryan, owner.

Bowman St., w of Thirty-fifth St., three-st'y dwell., 17' x 45'; C. Bartle, contractor.

Trinity Pl., between Twenty-second and Twenty-third Sts., fourth-st'y addition to 6 dwells.; B. Ketcham & Son, contractors.

Krail St., s of Queen St., three-st'y dwell., 18' x 46'; C. Bartle, contractor.

Main St., rear of, above Scott's Lane, two-st'y mill, 40' x 100'; I. & J. Dobson, owners.

Chestnut St., No. 2209, three-st'y dwell., 18' x 60'; D. J. Comber, owner.

Sepviva St., cor. York St., three-st'y dwell., 17' x 52'; W. D. Huston, contractor.

Thirteenth St., below Washington Ave., two-st'y shop, 20' x 82'; Jno. Russell, owner.

Twenty-seventh St., cor. Jefferson St., 8 two-st'y and 7 three-st'y dwells., two 13' x 38', and thirteen, 14' x 46'; P. H. Somerset, owner.

Forty-third St., cor. Silverton St., 4 three-st'y dwells., 16' x 48'; Jas. Bradley, contractor.

Fifty-sixth St., n of Haverford, two-st'y dwell., 18' x 45'; Chas. H. Young, contractor.

Broad St., cor. Wood St., addition to Industrial Art Hall, 60' x 63'; R. J. Dobbins, owner.

Lawrence St., No. 1436, three-st'y dwell., 15' x 40'; Geo. Kessler, contractor.

Bread St., n of Arch St., four-st'y factory, 50' x 90'; Thomas Leaming, contractor.

Second St., cor. Willow St., four-st'y store, 20' x 40'; A. B. Levis, contractor.

North Sixth St., No. 1815, two-st'y shop, 31' x 100'; Theo. Cornell, owner.

Neff St., w of Richmond St., two-st'y dwell., 16' x 42'; J. Ziegler, contractor.

Margaretta St., cor. Worth St., three-st'y dwell., 18' x 50'; Thos. Waters, contractor.

Richmond St., cor. Allegheny Ave., four-st'y warehouse, 39' 5" x 100'; S. B. McDowell, contractor.

Sixty-third St., cor. Vine St., 2 three-st'y dwells., 18' x 53'; Dickey & Arrison.

Thirty-first St., cor. Girard Ave., one-st'y railroad-station, 14' x 60'; C. R. Kohl & Bro., contractors.

May St., between Westminster and Lancaster Aves., 3 two-st'y dwells., 14' x 30'; R. G. Black, contractor.

Sailer's Lane, cor. Keystone St., 2 three-st'y dwells., 16' x 31'; Geo. Still, contractor.

Sixth St., n of Erie Ave., two-st'y dwell., 16' x 42'; Albert F. Raw, contractor.

Gillingham St., between Tackawana and Mulberry Sts., two st'y dwell., 14' x 40'; Wm. Worrell, contractor.

Wharton St., No. 524, two-st'y dwell., 16' x 45'; Geo. C. Jackson, contractor.

Reed St., e of Ninth St., dwell., 16' x 36'; J. P. McGonigal, contractor.

Twenty-third St., between Berks and Norris Sts., two-st'y dwell., 17' 9" x 35'; W. E. Shaffer, owner.

Sprague Ave., w of Dury's Lane, two-st'y dwell., 16' x 32'; McLaughlin & McManus, contractors.

Seventy-first St., cor. Greenway Ave., three-st'y dwell., 22' x 54'; Jno. Welsh, contractor.

Forty-first St., below Warren St., 2 two-st'y dwells., 16' x 42'; F. S. Michaelson, contractor.

Warren St., above Forty-first St., 6 two-st'y dwells., 14' x 42'; F. S. Michaelson, contractor.

Susquehanna Ave., below Delhi St., 2 three-st'y dwells., 15' x 42'; H. M. Campbell, contractor.

Thirty-sixth St., cor. Pine St., two-st'y veterinary college, 22' x 63'; J. Bradin, contractor.

Chester Ave., between Forty-eighth and Forty-ninth Sts., 4 three-st'y dwells., 17' x 55'; Jas. D. Arthur.

Wyoming St., w of Second St., three-st'y dwell., 32' x 38'; Jno. Davis, Jr., owner.

Duval St., w of Adams St., three-st'y dwell., 18' x 44'; Bella F. Maxwell, owner.

Penn St., n of Harrison St., 2 two-st'y dwells, 16' x 50'; J. C. Haines, contractor.

Cumberland St., w of Fourth St., 6 three-st'y dwells., 14', 15' and 16' x 44'; Brockelhurst & Ewing, owners.

Columbia Ave., No. 1937, three-st'y store and dwell., 22' x 71'; Hugh Hazlett, contractor.

Palmer St., e of Frankford Road, 2 three-st'y dwells., 16' x 45'; J. Ziegler, contractor.

Smedley St., cor. Venango St., 3 two-st'y and 1 three-st'y dwells., 14' x 30' and 16' x 32'; Julius Keller, contractor.

Eighth St., cor. Somerset St., three-st'y mill, three-st'y picker-room, two-st'y boiler-house, 29' x 66', 42' x 66', 65' x 200'; G. F. Payne & Co., contractors.

Orkney St., No. 2257, two-st'y dwell., 18' x 28'; E. C. Sheppard, contractor.

Twenty-third St., cor. Berks St., three-st'y store and dwell. and two st'y stable, 17' x 45' and 18' x 75'; P. H. Somerset, contractor.

Lawton St., both sides, between Moore and Mifflin Sts., 38 two-st'y dwells., 14' x 32'; J. E. Conroy, owner.

Vienna St., between Belgrade and Thompson Sts., two-st'y dwell., 17' x 49'; A. T. Richards, contractor.

North Twenty-fourth St., No. 1343, three-st'y dwell., 18' x 30'; W. R. Davis, contractor.

North Third St., No. 833, three-st'y dwell., 20' x 40'; Pauline Lehman, owner.

Thirty-sixth St., between Lancaster Ave. and Warren St., 6 two-st'y dwells., 15' x 46'; S. L. Sherman, owner.

Sixty-third St., cor. Vine St., one-st'y chapel, 53' x 73'; Jas. Johnston, contractor.

General Notes.

ATLANTA, GA. — The Capitol Commission have rejected all bids for the erection of a new capitol-building, and will advertise for more to be opened on September 24.

BINGHAMTON, N. Y. — Messrs. Hartwell & Richardson, architects, of Boston, have completed plans for a large residence, which will cost over $25,000.

BIRD ISLAND, MINN. — The foundation for the Catholic church is completed, and work on the superstructure will be pushed. The building will be 32' x 60'.

BRIDGEPORT, CONN. — The Catholics are to build a $70,000 church here.

DAVENPORT, IO. — The Sisters of the Academy are building a four-st'y building, 42' x 150' in size, to cost between $25,000 and $30,000.

HOLYOKE, MASS. — The committee on city property received, August 1, bids for the erection of an eight-room two-st'y brick school-house, with basement and attic, to be built on the corner of Chestnut and Sargeant Sts. The plans have been drawn by T. W. Mann.

KANSAS CITY, MO. — Hoover, Rhodes & Co., a warehouse, 75' x 130' 6", five stories high, at Kansas Ave., cor. Hickory St.; cost, $30,000.

LINCOLN, NEB. — The corner-stone of the new Capitol of Nebraska was laid on the 15th ult.

NORWICH, CONN. — The Free Academy is to be enriched by the addition of a new building, the gift of Mr. W. A. Slater.

SHADYSIDE, PITTSBURGH, PA. — A house for Robert Pitcairn, Esq., is being built from plans by Wilson Bros. & Co., architects.

Bids and Contracts.

CINCINNATI, O. — The following is a synopsis of bids for joiners' work and wood flooring for the custom-house and post-office:—

Joiners' work, white pine and mahogany: the Robert Mitchell Furn. Co., $29,499.31; Tomlinson & Carsley, $41,076.35; James Griffith & Sons, $42,587.65; Jos. Thomas & Son, $44,039.

White pine and white oak: Mitchell Furn. Co., $22,675.14; Tomlinson & Carsley, $34,926.99; Griffith, $37,058.40; Thomas, $37,254.

White pine and black walnut: Mitchell, $26,187.49; Tomlinson & Carsley, $37,451.30; Griffith, $39,382.70; Thomas, $42,500.

Wood flooring: Mitchell, $23,861.81; Griffith, $17,089; Thomas, $17,250.

Additional 5-4 flooring per square: Mitchell, $21; Griffith, $14; Thomas, $13.85.

The bid of the Robert Mitchell Furniture Company, $29,499.31, for white-pine and mahogany, and of James Griffith, $17,089, for wood flooring, the lowest in each case, has been accepted.

JACKSON, MICH. — The following is a synopsis of bids of low-temperature hot-water heating-apparatus for the court-house: —

Bartlett, Hayward & Co., $6,464 (*accepted*).
Kelley & Jones Company, $7,262.
Walworth Manufacturing Company, $7,997.
Marshbank & Tippett, $8,350.
Samuel I. Pipe & Co., $8,970.

PLYMOUTH, MASS. — The contract for building the new house of correction has been awarded to J. H. Coon & Co., of Boston, and they have given the required bonds. The building is to be finished by January 1, and work will be begun at once.

PROPOSALS.

JAIL.

[At Salem, Mass.]

The undersigned will receive bids for the entire work, to reconstruct and enlarge the county jail at Salem to accommodate 150 prisoners. The main building will be of granite, and the additions of brick; the whole to be under the supervision of Rufus Sargent, the architect, and according to his plans and specifications, which can be seen at our office, court-house, Salem, from 9 A. M. to 4 P. M., every day **from August 11 to August 18.** Proposals directed: John W. Raymond, Chairman of the Board. The Commissioners reserve the right to reject any or all bids, if, in their judgment, the interests of the county require it.

JOHN W. RAYMOND,
EDWARD B. BISHOP,
GEORGE J. L. COLBY. } County Commissioners.

451

STONE AND BRICK WORK.

[At Hannibal, Mo.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., July 25, 1884.

Sealed proposals will be received at this office **until 2 o'clock,** P. M., **on the 16th day of August, 1884,** for furnishing all the labor and materials for building, complete, the basement and superstructure of the post-office, etc., at Hannibal, Mo., in accordance with drawings and specifications, copies of which may be seen and any additional information obtained on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
450 Supervising Architect.

WHARFINGS.

[At Three Rivers, Conn.]

HARBOR COMMISSIONERS' OFFICE, July 14, 1884.

Sealed tenders, addressed to the undersigned, and endorsed, "Tenders for Three Rivers Harbor Works," will be received **until Saturday, the 9th day of August, 1884,** for the construction of Deep Water Wharfing in the Harbor of Three Rivers, according to a plan and specification to be seen on application at the Harbor Commissioners' Office, Three Rivers, on and after Saturday, the 19th day of July, 1884, where printed forms of tender and other information can be obtained.

The works to be constructed are payable in Three Rivers Harbor Debentures.

Persons tendering are hereby notified that tenders will not be considered unless made on the printed forms supplied and signed with their actual signatures.

Each tender must be accompanied by an accepted bank check for the sum of $1,000, payable to the Chairman of the Harbor Commission, which will be forfeited if the party tendering declines to enter into the contract for the work.

For the due fulfilment of the contract security will be required by the deposit of money to the amount of five per cent on the bulk sum of the contract, of which the sum sent in with the tender will be considered a part. All checks will be returned to persons whose tenders are not accepted.

The Commissioners do not, however, bind themselves to accept the lowest or any tender.

By order, GEORGE BALCER,
450 Secretary Harbor Com. Three Rivers.

Publishers' Department.

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New Advertisements.

CRYSTAL PLATE-GLASS CO. (St. Louis, Mo.), Glass. Page 3, Supplement.
EUREKA SLATE CO. (Poultney, Vt. and London, Eng.), Roofing Materials. Page xiv.
OTTO GAERTNER (New York), Decorator. Page xi.

WANTED.

SITUATION. — Wanted, a situation by an experienced draughtsman, well posted in construction and details. Address, C. M., care of *American Architect*. 451

PROPOSALS.

COURT-HOUSE. [At Carrollton, O.]

Sealed proposals will be received at the Auditor's office of Carroll County, Ohio, **from the 5th day of July, 1884, to the 7th day of August, 1884, inclusive, until 1 o'clock,** P. M. of the day last mentioned, for furnishing materials and performing the necessary labor for the construction of a new Court-House and Jail in Carrollton, Carroll County, O. Court-House and Jail to be bid on separately. Each class of work and materials to be separately bid upon; to which may be added a bid for the entire work, including materials.

Plans and specifications may be seen at the Auditor's office on and July 10, 1884. Printed specifications may be had at the Auditor's office for 50 cents.

L. M. BARRICK,
Auditor of Carroll County.

N. B. — Blanks for bidders furnished on request.
449

LIGHTING. [At New York, N. Y.]

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., July 24, 1884.

Sealed proposals will be received at this department **until 1 o'clock,** P. M., **on Monday, August 11, 1884,** for supplying light for the United States Court-House and Post-Office building in the city of New York for the fiscal year ending June 30, 1885, with privilege of extension for a period of three years thereafter, at same compensation.

Proposals for gas should state the net price per 1,000 cubic feet.

Proposals for electric-light should state: —

1. The cost of a complete plant of 1,200 incandescent lights, including lamps, wires, engines, dynamos, belting, shafting, boilers and whatever may be necessary to complete the installation, said plant to be subject to a test of thirty days before acceptance or rejection.

2. Furnishing a plant as above, to be owned by the Company, with stated annual cost of running the same, including personal service, with the privilege of buying the plant for a stipulated price.

3. The cost of 1,000 or more sixteen-candle power incandescent lights to be supplied from central stations, inclusive of all expense incident thereto.

Proposals for electric-light should state in detail in each instance articles and service embraced in bid, and specific sum therefor, in order that intelligent comparison of bids may be made.

The Department reserves the right to reject any or all bids, and to waive defects.

Bids should be addressed to the Secretary of the Treasury, and endorsed, "Proposals for supplying light for the Court-House and Post-Office, New York.

449 CHAS. E. COON, Acting Secretary.

PROPOSALS

IRON-WORK. [At Frankfort, Ky.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., July 26, 1884.

Sealed proposals will be received at this office **until 2** P. M., **on the 15th day of August, 1884,** for furnishing and setting in place, complete, the rolled-iron beams and cast-iron columns required in the court-house, post-office, etc., building at Frankfort, Ky., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office, or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
450 Supervising Architect.

STATE CAPITOL. [At Atlanta, Ga.]

New sealed proposals for the Georgia State Capitol Building are invited by the Capitol Commission **until September 24, 4** P. M. **1884.**

Plans, specifications, schedules and instruction to bidders may be had upon application to the Commission, in Atlanta, Ga., or to Edbrooke & Burnham, architects, 184 Dearborn St., Chicago, Ill.

Proposals may be submitted for the entire work, or for any classified portion, also for materials.

The Commission reserves the right to accept any bid, or to reject the whole.

No proposals will be considered unless made out on the schedules blanks.

All bidders will be required to furnish bond and security or a certified check (payable to the Chairman of the Board) equal in amount to five per cent of the bid submitted, as a guarantee to enter into contract with the Board should his bid be accepted.

Bids must be sealed and indorsed "Proposals for State Capitol Building," and addressed to the Board of Capitol Commissioners, Atlanta, Ga.

HENRY McDANIEL, Governor,
456 and Ex-Off. Ch'n Commission.

STONE AND BRICK WORK. [At Jefferson City, Mo.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., July 29, 1884.

Sealed proposals will be received at this office **until 2 o'clock,** P. M., **on the 26th day of August, 1884,** for furnishing all the labor and materials for building, complete, the basement and superstructure of the court-house, etc., at Jefferson City, Mo., in accordance with drawings and specifications, copies of which may be seen, and any additional information obtained on application at this office, or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
460 Supervising Architect.

COURT-HOUSE AND JAIL. [At Pittsburgh, Pa.]

CONTROLLER'S OFFICE, ALLEGHENY CO.,
PITTSBURGH, PA., June 26, 1884.

Sealed proposals for the erection of a court-house and jail at Pittsburg, Allegheny County, Pa., will be received at this office by the controller, **until 3 o'clock,** P. M., **of August 16, 1884.**

All proposals must be made in accordance with the plan and specification prepared by H. H. Richardson, architect, which will be open for examination at the office of the County Commissioners, on and after the first Monday of July.

All proposals must be made on blanks furnished by the architect on application at the aforesaid commissioners' office.

The contract will be awarded to the lowest and best bidder upon giving to the county a good and sufficient bond in the sum of five hundred thousand dollars ($500,000), with approved securities for the faithful performance of the work.

All bids must be accompanied with an approved bidder's bond in the sum of one hundred thousand dollars ($100,000).

The commissioners reserve the right to reject any and all bids.

JOSEPH SPEER,
449 Controller of Allegheny County.

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should be strong, simple in construction, noiseless in movement, attractive in appearance, easily put in place, and above all, the conformation of seat and back should be such as to admit of a person sitting in them for *hours* with the greatest ease and comfort.

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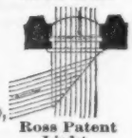

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Visitors' Correspondence may be addressed in care of this establishment.

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PROPOSALS.

IRON BRIDGE. [At Waterloo, N. J.]

The Board of chosen freeholders of the Committee of Sussex submits to the public a proposal to build an iron bridge across the Musconnetkong at Waterloo, N. J., of the following dimensions, viz.: —

Seventy feet long and 12 feet wide, or 70 feet long and 16 feet wide.

Proposals must be submitted **on or before August 9, 1884,** on which day the Committee will be on the ground at 2 P. M.

The Committee reserve the right to reject any or all bids.

Communications may be addressed to

N. A. STACKHOUSE,
Committee of Board,
449 Andover, N. J.

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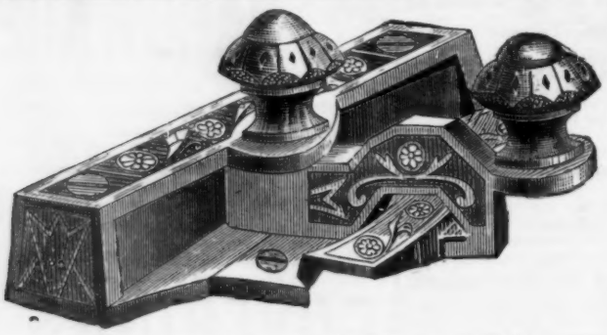

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7	.70	35	1.00	65	"	6.50	190	" "	10.00
10	.75	40	2.00	75	"	7.00		Trade discount, 33⅓%.	

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PROPOSALS.

SEWER.

[At Norristown, Pa.]

NORRISTOWN, July 10, 1884.

Sealed proposals will be received by the Street and Road Committee of the borough of Norristown, Pa., addressed to Henry Fox, Chairman, **until the 11th day of August, A. D., 1884,** for the furnishing of all the material and the complete construction of a three-foot (inside diameter) sewer, in Main or Egypt St., from Strawberry Alley to a point about Cherry St., in accordance with plans and specifications to be seen at the Borough Engineer's office, No. 505 Swede St.

The committee reserve the right to reject any and all bids. 449

BRASS TUBES.

[At Washington, D. C.]

U. S. NAVY PAY OFFICE,
WASHINGTON, July 8, 1884.

Sealed proposals, in duplicate, to be indorsed "Proposals for Brass Tubes," will be received at this office **until 12 M., the 9th day of August, 1884,** for the below-described brass tubes, to be delivered at the Navy-Yard, Washington, D. C., free of any expense to the Government, and subject to the usual inspection and conditions, viz.: —

BUREAU OF EQUIPMENT AND RECRUITING.

475 brass tubes, 2½" outside diameter; each 10' long; thickness, No. 11 Stubbs' wire gauge; estimated weight, 14,060 pounds. To be equal to the seamless brass tubes manufactured by the American Tube Works, 97 State St., Boston, Mass.

No person shall be received as a contractor who is not a manufacturer of, or regular dealer in, the articles which he offers to supply; and the right is reserved to reject any or all bids.

Responsible security required on the bids for faithful performance.

Blank forms for bids to be had at this office, and all necessary information at the Navy Yard.

THOMAS H. LOOKER,
Pay Director, U. S. N.,
449 Navy Pay Agent.

PROPOSALS.

IRON BRIDGE.

[At Salem, N. J.]

Sealed proposals will be received by the Board of Chosen Freeholders of the County of Salem, **until the 13th day of August next, at noon,** for the building of an iron bridge over Salem Creek, at the city of Salem, in the County of Salem, State of New Jersey.

Specifications can be had by addressing the undersigned, and plans seen by calling on I. O. Acton, Geo. R. Morrison, or John P. Flynn, at Salem, N. J.

The Board reserves the right to accept or reject any or all bids. Address, JOHN P. FLYNN,
Clerk of the Board of Chosen Freeholders
449 of Salem County, N. J.

PROPOSALS.

TO BUILDERS.

Headquarters of N. Y. S. Soldiers' and Sailors' Home, Bath, Steuben Co., N. Y.

July 18th, 1884.

Proposals for erecting a new Barrack, and other buildings, at Soldiers' and Sailors' Home, Bath, Steuben Co., N. Y.

Sealed proposals will be received at the office of the Superintendent of the Soldiers' and Sailors' Home, Bath, Steuben Co., N. Y., until 12 o'clock M. Wednesday, Sixth day of August, 1884, for furnishing labor and material for the above buildings, in accordance with Plans and Specifications for same to be seen and estimated upon at the Headquarters of the said Home. Proposals to be accompanied by satisfactory bonds, proving genuineness of bids.

Proposals to be addressed to
Gen'l. W. F. ROGERS, Chairman Committee
on Building and Grounds,
449 *Bath, Steuben Co., N. Y.*

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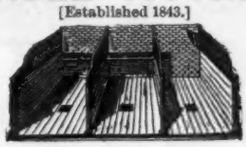

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Classified Advertisements.

[Advertisers can be indexed only under a single head free of charge.]

ARCHITECTS' MATERIALS. PAGE
Keuffel & Esser, New York.....xx
Albert Levy, New York.....iv
E. G. Soltmann, New York.....2
Wadsworth, Howland & Co., Boston.....iv
ARTISTIC DECORATIONS.
Sypher & Co., New York.....i
ARTIFICIAL LEATHER.
Evans Artificial Leather Co., Boston.....ix
ART JOURNALS.
Decorator and Furnisher Co., New York.....4
Monogue Marks, New York.....xi
ANNUNCIATORS.
Edwards & Co., New York.....iv
W. R. Ostrander & Co., New York.....ix
Western Electric Co., New York&Chicago.....ix
ASBESTOS COVERINGS.
H. W. Johns M'f'g Co., New York.....xi
ASPHALT. Henry R. Bradbury, New York.....x
New York Mastic Works.....i
AWNINGS.
F. O. North & Co., Boston.....ix
BASIN WASTE.
H. M. Weaver, Mansfield, O.....xvi
BELL FOUNDERS.
H. McShane & Co., Baltimore.....v
Vanduzen & Tift, Cincinnati, O.....viii
BINDERS (TEMPORARY). J. R. Osgood & Co....iv
BOILERS.
Harrison Boiler Works, Philadelphia.....x
BOOKS AND JOURNALS.
Wm. T. Comstock, New York.....2
J. R. Osgood & Co., Boston.....xix
BRASS GOODS.
Manhattaa Brass Co., New York.....2
BRICK (ORNAMENTAL).
Anderson Pressed Brick Co., Chicago.....xviii
Brick Enamelling Co., Philadelphia.....xviii
A. T. Chur, New York.....xix
Hydraulic Press Brick Co., St. Louis.....xviii
Peerless Brick Co., Philadelphia.....xviii
Rowe & Denman, New York.....xviii
Waldo Bros., Boston.....xix
BUILDING PAPER.
N. Y. Coal Tar Chemical Co., New York.....x
Scott Paper Co., Phila.....xiv
CARPETINGS.
W. & J. Sloane, New York.....i
J. H. Pray, Sons & Co., Boston.....i
CEMENT. James Brand, New York.....xviii
Brooks, Shoobridge & Co., New York.....iv
Howard Fleming, New York.....x
Gustav Grawitz.....xviii
Gabriel & Schall, New York.....xviii
Johnson & Wilson, New York.....xx
Sinclair & Babson, New York, N. Y.....xviii
CEMENT (SELENITIC).
Selenitic Fire-proof Building Co., Chelsea, Mass.....iv
CHAIR-SEATING.
Baker, Pratt & Co., New York and Phila.....ix
Harwood Chair Seat Co., Boston.....ix
CLOCKS FOR PUBLIC BUILDINGS.
E. Howard Watch & Clock Co., Boston.....ix
Seth Thomas, Thomaston, Conn.....xvi
CONDUCTORS (WATER).
Austin, Obdyke & Co., Philadelphia.....ii
Boston Spiral Tube Works, Boston.....ii
Solderless Standing-Seam Conductor Co., Allegheny, Pa.....ii
COPPERSMITHS AND METAL-WORKERS.
G. L. Swett & Co., Boston.....iv
CORNICES (GALVANIZED IRON).
Bakewell & Mullins, Salem (Col. Co.), O..xvi
Mesker & Bro., St. Louis, Mo.....xv
COVERING (BOILER).
Shields & Brown, Chicago.....vi
DECORATIVE LEATHER.
Walker & Thompson, New York.....iii
C. R. Yandell & Co., New York.....i
DECORATORS.
P. M. Almini, Chicago.....iii
Cox Sons, Buckley & Co., New York.....ii
Otto Gaertner, New York.....xi
Hankins, Chicago.....iii
Healy & Millet, Chicago.....iii
J. Holmes, Boston.....iii
La Farge Decorative Art Co., New York.....iii
Donald McDonald, Boston.....ii
W. J. McPherson, Boston.....iii
Frank Hill Smith, Boston.....iii
DOOR-KNOBS.
Dibble M'f'g Co., Trenton, N. J.....vi
ELEVATORS, ETC.
Elsaesser, Boston.....v
Clem & Morse, Philadelphia.....iv
Crane, New York & Chicago.....i
Thos. Dyer, Philadelphia.....v
Eaton & Prince.....v
L. S. Graves & Son, Rochester, N. Y.....i
Otis Brothers & Co., New York.....i
Sherrill Roper Air Engine Co.....v
Stokes & Parrish, Philadelphia.....i
ELEVATORS, ETC. (*continued.*)
Sulzer & Vogt, Louisville, Ky.....v
Whittier Machine Co., Boston.....i
Z. Wile, Boston.....v
ENGINES.
Reald & Morris, Baldwinsville, N. Y.....xvi
ENGINES (CALORIC PUMPING).
Delamater Iron Works, New York.....x
ENGINES (GAS).
Schleicher, Schumm & Co., Philadelphia.....x
EXHIBITION (BUILDING).
H. L. Gay, Chicago.....xi
FAUCET. Renton Bros., New York.....xvi
FENCING (IRON).
David Pettit & Co., Phila.....xv
FIRE-PROOF BUILDING.
Fire-Proof Building Co., New York.....xix
Frank Lyons, Jr., New York.....xix
Magneso Calcite Fire-Proof Co., Boston.....xix
Henry Maurer, New York.....xix
Ottawa Tile Co., Chicago.....xix
Raritan Hollow and Porous Brick Co.....xix
Wight Fire-Proofing Co., New York.....xix
FLOORS.
National Wood Mf'g. Co., New York.....xx
Wm. Hannam & Co., New York.....xx
FLOORS (INLAID).
W. E. Wheeler, Toledo, O.....iv
FLOORS (WATER-TIGHT).
W. L. Dolbeare, Boston.....2
FLOORS (WOODEN).
W. A. Runyon & Co., Rochester, N. Y.....ix
FURNITURE.
Keeler & Co., Boston.....ix
Tomlinson & Carsley, Chicago.....ix
GAS-FIXTURES.
Archer & Pancoast M'f'g Co., New York.....x
Mitchell, Vance & Co., New York.....4
Oxley, Giddings & Enos, New York.....i
GAS-MACHINES.
Combination Gas-Machine Co., Detroit.....viii
Denny Bros. & Co., New York.....viii
Pa. Globe Gas-Light Co., Phila.....ix
Tirrill Gas-Machine Co., New York.....viii
GAS-STOVES.
Goodwin Gas-Stove Co., Phila.....vii
GAUGES.
S. P. Jones, Boston, Mass.....vii
GLASS.
Crystal Plate-Glass Co., St. Louis, Mo.....3
Pittsburgh Plate Glass Co., Creighton, Pa..xii
GLASS ROOFING.
Arthur E. Rendle, New York.....1
GLASS (STAINED AND ORNAMENTAL).
James Baker & Son, New York.....ii
Geo. R. Clarke & Co., Boston.....ii
Wm. Coulter & Son, Cincinnati.....ii
Otto F. Falck & Co., New York.....ii
R. S. Groves & Sons, Philadelphia.....ii
H. Edgar Hartwell, New York.....iii
Kinsella & Haywood, Chicago.....ii
Kelley & Co., Boston.....iii
S. S. Marshall & Bros., Allegheny, Pa.....iii
John Matthews, New York.....iv
McCully & Miles, Chicago.....ii
W. J. McPherson, Boston.....ii
Donald MacDonald, Boston.....iii
Redding, Baird & Co., Boston.....ii
Samuel West, Boston.....ii
GRATES, ETC.
J. S. Conover & Co., New York.....xx
Henry Dibblee, Chicago.....iii
Eureka Grate Works, Cincinnati, O.....iv
W. H. Harrison & Bro., Philadelphia.....vi
Edwin A. Jackson & Bro., New York.....x
Wm. H. Jackson, New York.....xx
Open Stove Ventilating Co., New York.....vii
HARDWARE.
Burditt & Williams, Boston.....v
Manhattan Hardware Co., Reading, Pa.....xii
A. G. Newman, New York.....2
Jas. W. Vinal, Boston.....xiii
HARNESS BRACKET.
Jas. J. Read, Boston.....3
HEATING APPARATUS.
Bartlett, Hayward & Co., Baltimore.....i
Boynton Furnace Co., New York.....xiii
Geo. F. Geibech, Phila.....vii
Richardson & Boynton Co., New York.....xii
HEATING APPARATUS (STEAM).
Peter Backus, New York.....vi
John Davis & Co., Chicago, Ill.....viii
Detroit Steam Radiator Co., Detroit, Mich..vii
Edward E. Gold & Co., New York.....vii
A. A. Griffing Iron Co., Jersey City.....xx
Holland & Thompson, Troy, N. Y.....vi
Newell Universal Mill Co., New York.....vii
E. Rutzler, New York City.....iii
H. B. Smith Co., New York.....vii
Universal Steam-Heating Co., New York..xiii
James P. Wood & Co., Philadelphia.....i
HEATING AND VENTILATING.
Smith & Anthony Stove Co., Boston, Mass...vi
HELIOTYPE PROCESS.
Heliotype Printing Company, Boston.....xi
HINGES.
American Machine Co., Philadelphia.....4
M. W. Robinson, New York.....xv
HINGES (SPRING).
Van Wagoner & Williams Co., New York....xx
INSURANCE.
American Fire Ins. Co.....x
Hanover Fire Ins. Co.....v
Insurance Co. of North America, Phila.....4
United States Mutual Ins. Co., New York.....v
IRON ROOFING.
Cincinnati Corrugating Co., Cincinnati....xiv
IRON-WORK (ARCHITECTURAL).
Bartlett, Hayward & Co., Baltimore.....i
Boston Bridge Works.....iv
T. H. Brooks, Cleveland.....iv
Carnegie Bros. & Co., Pittsburgh, Pa.....xv
Cheney & Hewlett, New York.....xv
Composite Iron-Works Co., New York.....xi
Cooper, Hewitt & Co., New York.....xvi
Samuel J. Creswell, Philadelphia.....xv
J. B. & J. M. Cornell, New York.....xv
J. G. & T. Dimond, New York.....xv
Manly & Cooper M'f'g Co., Phila.....xv
McHose & Lyon, Dayton, O.....xv
John Merry, New York.....xv
Mesker & Bro., St. Louis, Mo.....xv
A. Northrop & Co., Pittsburgh, Pa.....xv
Passaic Rolling Mill Co., Paterson, N. J....xv
Phœnix Iron Co., Philadelphia.....xv
Snead & Co., Louisville, Ky.....xv
Union Foundry and Pullman Car Wheel Works, Chicago, Ill.....xv
Wallis Iron Works, Jersey City, N. J.....xv
J. P. Walton, Cincinnati, O.....iv
KILNS.
W. D. Thompson, New York.....ii
LINCHUSTA-WALTON.
Fr. Beck & Co., New York.....x
LUMBER.
W. M. Dwight & Co., Detroit, Mich.....iii
LUMBER (HARDWOOD).
The E. D. Albro Co., Cincinnati, O.....ix
MACHINERY.
Goodell & Waters, Philadelphia.....3
MACHINERY (CORNICE).
Calvin Carr Machine Co., Newark, N. J....xiv
MACHINERY (LAUNDRY).
Troy Laundry Machinery Co., Troy.....xx
MAIL CHUTES.
Cutler M'f'g Co., Rochester, N. Y.....xvi
MANTELS.
A. H. Andrews & Co., Chicago.....ix
Henry Dibblee, Chicago.....iii
Joseph S. Miller & Bro., Philadelphia.....vii
MANTELS (SLATE).
Fischer, Leaf & Co., Louisville, Ky.....vi
MARBLE. S. Klaber & Co., New York.....3
MARBLE-WORKERS.
A. L. Fauchere & Co., New York.....ii
Robert C. Fisher, New York.....i
METAL-WORK (ART).
Tahanto M'f'g Co., Boston.....iv
METAL-WORKERS.
J. & R. Lamb, New York.....ii
MINERAL WOOL.
U. S. Mineral Wool Co., New York.....iv
MORTAR BLACK. Henry D. Dupee, Boston..xviii
MORTAR COLORS.
American Soapstone Finish Co., Providence, R. I.....iv
Samuel H. French & Co., Philadelphia.....iv
McIlvaine Bros., Phila.....xviii
OILS.
Robert Colgate & Co., New York.....v
PAINT.
Atlas Paint Co., Pittsburgh, Pa.....xiv
PAINT (FIRE-PROOF).
Chicago Fire-proof Paint Co., Chicago.....xiv
PENS.
The Esterbrook Steel Pen Co., New York.....2
PHOTOGRAPHS.
Albert Levy, New York.....iv
J. W. Taylor, Chicago, Ill.....i
PIPE-COVERING.
The Chalmers-Spence Co., New York.....viii
PULLEY-BLOCKS.
Yale & Towne M'f'g Co., Stamford, Conn...xx
PUMPS (STEAM).
H. R. Worthington, New York and Boston..v
RADIATOR (STEAM).
Detroit Steam-Radiator Co., Detroit, Mich...viii
REFLECTORS.
I. P. Frink, New York.....xvi
REGISTERS.
Tuttle & Bailey Man'f'g Co., New York and Boston.....vii
ROOFING MATERIALS.
Bodine Patent Roofing Co., Mansfield, O...xiv
Eureka Slate Co., Poultney, Vt.....xiv
Granite Roofing Co., Phila.....xiv
Merchant & Co., Phila.....xiv
N. E. Felt Roofing Co., Boston.....xiv
Penn Roofing Co., Philadelphia.....xviii
H. F. Watson, Erie, Pa.....xiv
ROOFERS.
John Farquhar's Sons.....x
R. Philip Gormully, Chicago.....xiv
Knisely & Miller, Chicago, Ill.....xiv
RUBBER GOODS.
N. Y. Belting & Packing Co., New York.....iii
RUGS.
H. A. Hartley & Co., Boston.....i
SANITARY SUPPLIES.
Myers Sanitary Depot, New York.....xx
SASH-CHAINS. Thomas Morton, New York....vi
Smith & Egge M'f'g Co., Bridgeport, Conn....4
SCENERY (THEATRICAL).
Lafayette W. Seavey, New York.....xx
SCHOOLS (ARCHITECTURAL).
Cornell University, Ithaca, N. Y.....xiii
Institute of Technology, Boston.....xiii
SCREENS.
American Screen Co., Brookline, Mass.....ix
SEWER-GAS TRAP.
B. P. Bower & Co., Cleveland.....xvii
SEWER PIPE.
Akron Sewer Pipe Co. Akron, O.....xviii
SHINGLE STAINS.
S. Cabot, Jr., Boston.....v
SHUTTERS.
Clark, Bunnett & Co., New York.....xx
SHUTTER-WORKER.
C. S. Kempton, New York.....4
SKYLIGHTS, ETC.
Bickelnoupt Bros., New York.....viii
G. Hayes, New York.....viii
S. J. Pardessus, New York.....viii
John Seton, Brooklyn.....viii
E. Van Noorden, Boston.....viii
SLATE.
T. F. & J. A. Hayden, St. Louis, Mo.....xiv
Story & Wilbur, Boston.....xiv
SNOW-GUARDS. John H. Hiller, Boston.....x
SOAPSTONE FINISH.
American Soapstone Finish Co., Providence, R. I.....3
STABLE FITTINGS.
Samuel S. Bent & Son, New York.....xiii
STATUARY (BRONZE).
National Fine Art Foundry, New York.....xv
STONE (BUILDING).
Hallowell Granite Co., Bedford, Ind.....xvii
M. H. St. John, New York.....xvii
Ohio Building Stone Co., Cleveland.....i
G. P. Sherwood, New York.....xvii
Wm. Struthers & Sons, Philadelphia.....iii
Thomlinson & Reed, Chicago.....xvii
STOP-COCK.
Thos. Kelly & Bros., Chicago, Ill.....xvii
TAPESTRIES.
C. S. Samuel & Co., New York.....iii
TERRA-COTTA.
Baltimore Terra-Cotta Co., Baltimore, Md...xix
Boston Terra-Cotta Co.....xix
A. Hall Terra-Cotta Co., Perth Amboy.....x,x
Northwestern Terra-Cotta Wks., Chicago...xix
Indianapolis Terra-Cotta Co., Ind'polis.....xix
H. A. Lewis, Boston.....xix
Perth Amboy Terra-Cotta Co.....xix
Young O. Wilson & Son, Baltimore, Md.....xix
TILES.
American Encaustic Tiling Co., New York....i
T. Aspinwall & Son, New York.....i
Alfred Boote, New York.....ix
Caryl Coleman, New York.....iii
Henry Dibblee, Chicago.....iii
J. G. & J. F. Low, Chelsea, Mass.....iii
Miller & Coates, New York.....i
Fernando Miranda, New York.....i
Sharpless & Watts, Philadelphia.....ii
U. S. Encaustic Tile Co., Indianapolis.....i
TRANSOM LIFTER.
F. A. Reiher & Co., Chicago.....ix
J. F. Wollensak, Chicago.....ix
TRAPS.
Jas. Barrett, Boston.....xvii
TYPE-WRITING.
Mary Seymour, New York.....xi
URINALS. W. W. Perrine, New York.....xvii
VALVES AND PACKING.
Jenkins Brothers, New York.....x
Washburn & Moore, Yonkers, N. Y.....xvi
VANES. Thos. W. Jones, New York.....xiii
VARNISH. Parker & Gillespie, New York.....3
VAULT LIGHTS.
Dauchy & Co., Chicago.....xi
VENTILATION.
Globe Ventilator Co., Troy, N. Y.....viii
WALL PAPER.
C. H. George, New York.....iii
WANTED. *American Architect*.....xi
WATER-CLOSETS.
Hartford Sanitary Plumbing Co., H'f'd...xvi
J. L. Mott Iron Works, New York.....xvii
WATER COLORS.
J. Marsching & Co., New York.....3
WATER-PROOFING.
Theodore Hunt, St. Louis, Mo.....xix
WIRE LATHING, ETC.
Clinton Wire Cloth Co., Clinton, Mass.....v
WIRE-WORK
Ludlow-Saylor Co., St. Louis, Mo.....v
WIRE AND IRON WORK.
National Wire & Iron Co., Detroit, Mich....xii
WOOD FINISH.
Bridgeport Wood Finishing Co., New York..3
WOOD TURNING.
N. Y. Wood Turning Co., New York.....3

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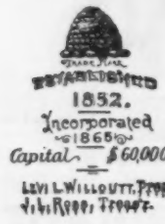

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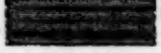

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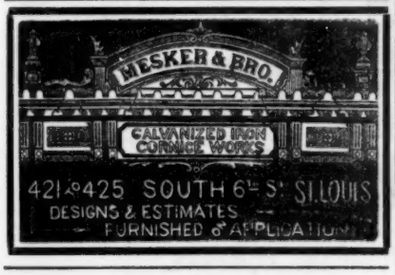

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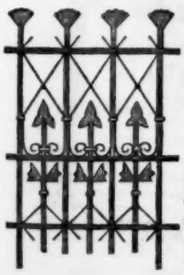

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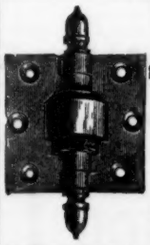

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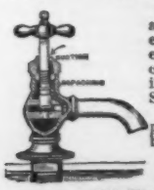

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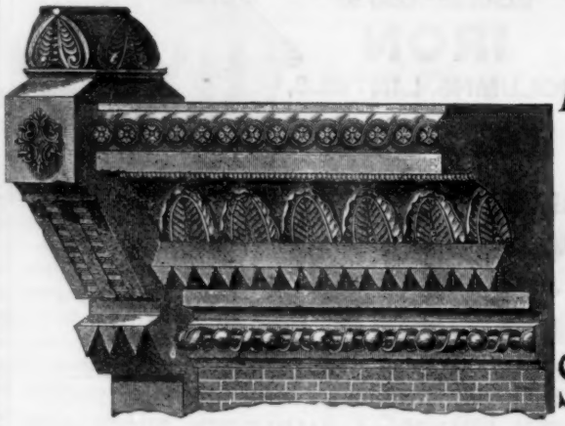

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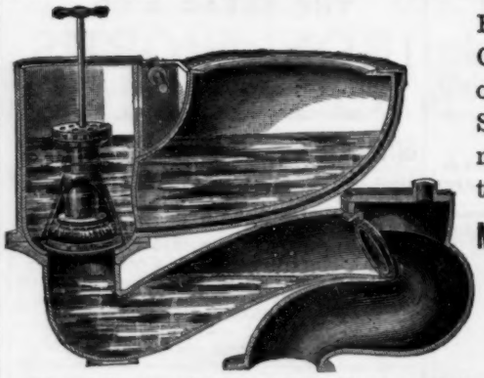

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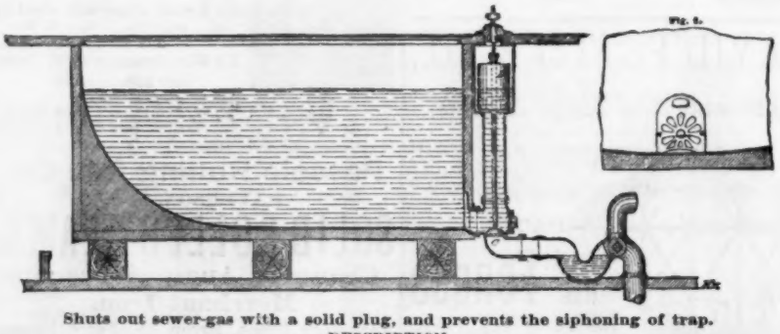

Shuts out sewer-gas with a solid plug, and prevents the siphoning of trap.

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C represents a solid brass valve, ground to the outlet perfectly tight, preventing the escape into the room of any gases from the sewer-pipe, and making it impossible for water to either siphon or evaporate from the trap. *B* shows a float which, upon any increase of water in the basin above the dotted lines shown, rises and lifts the valve *C* from its seat, and permits the water to escape under it and into the waste-pipe as fast as it enters the basin. There is no overflow-pipe, or plug and chain, used in the basin. The valve *C* retains water in the basin, which is emptied by lifting the handle that projects through the slab.

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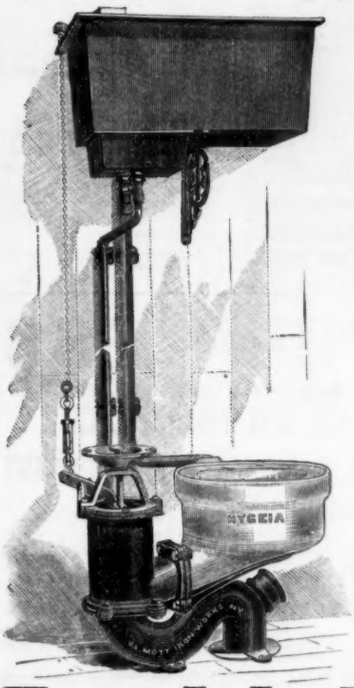

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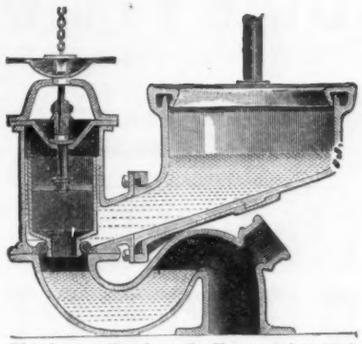

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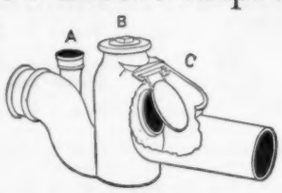

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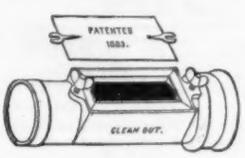

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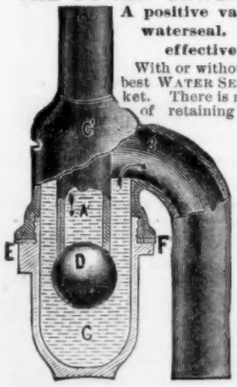

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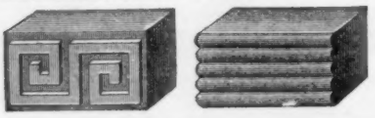

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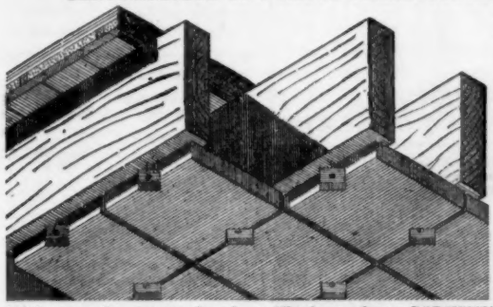

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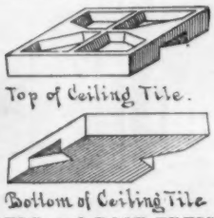

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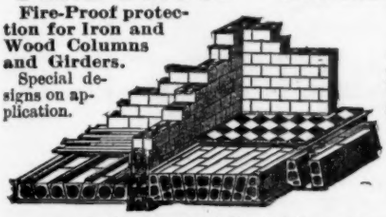

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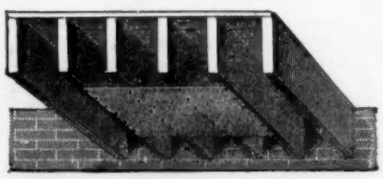

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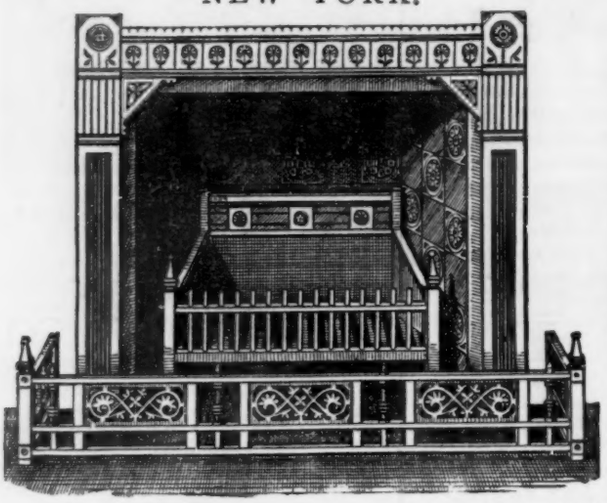

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